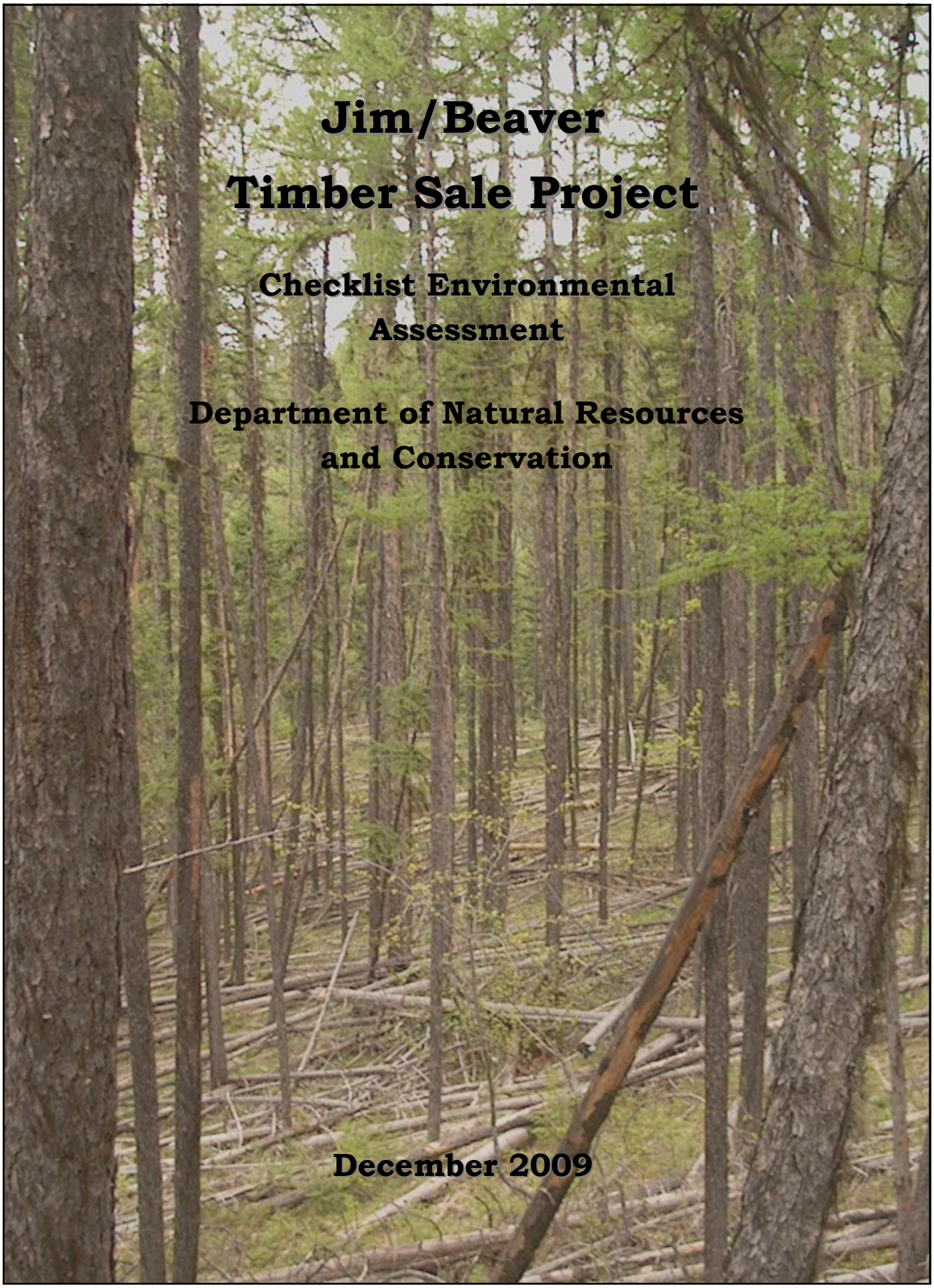


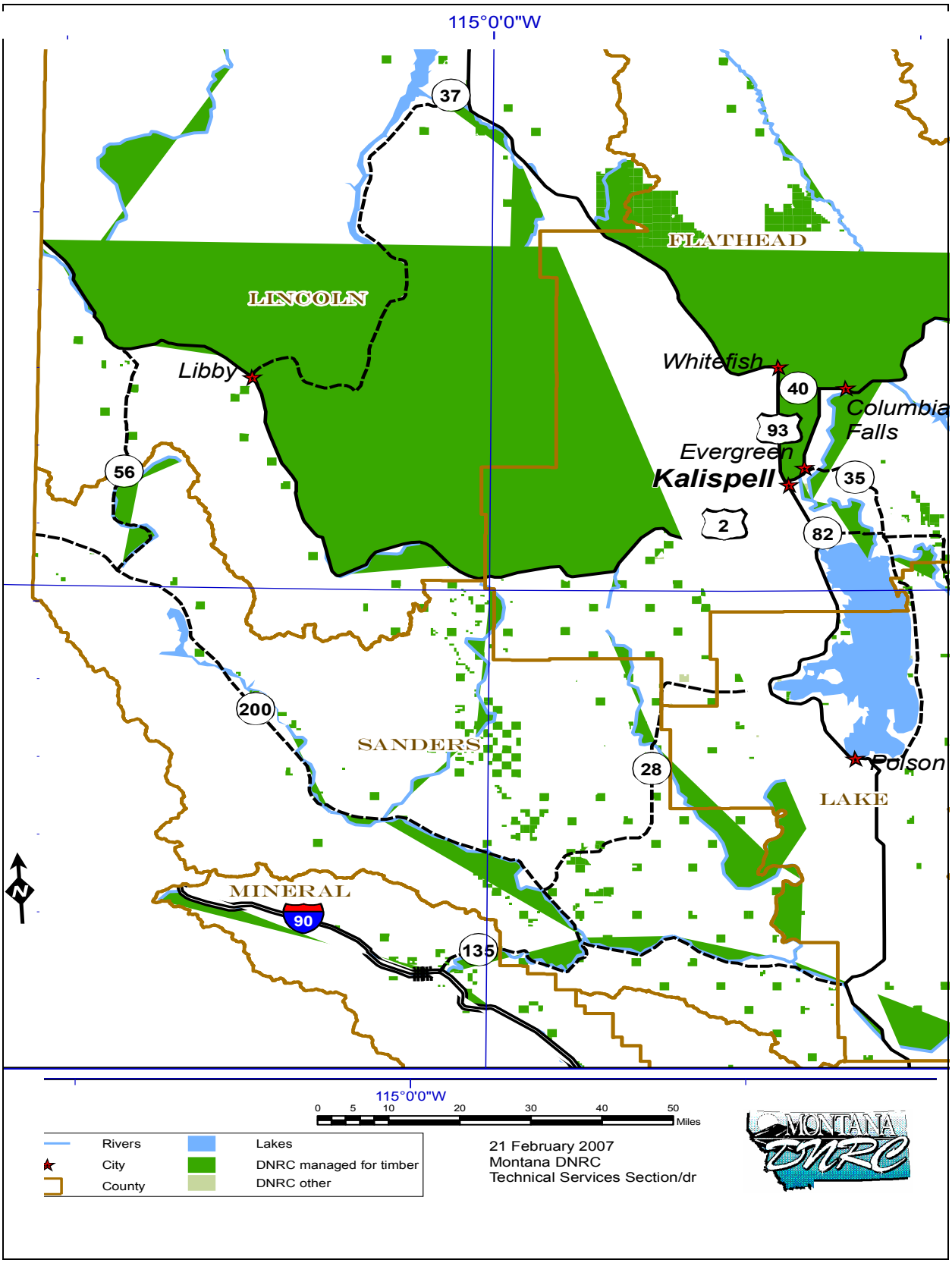
Jim/Beaver
Timber Sale Project

Checklist Environmental Assessment

Department of Natural Resources and Conservation

December 2009

JIM BEAVER VICINITY MAP



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JIM/BEAVER TIMBER SALE PROPOSAL
CHECKLIST ENVIRONMENTAL ASSESSMENT

Project Name: Jim Beaver Timber Sale Project

Proposed Implementation Date: December 2009 through 2013

Proponent: Department of Natural Resources and Conservation (DNRC), Northwestern Land Office, Stillwater Unit

Location: Sections 16, 25, and 36, Township 33 north, Range 26 west

I. TYPE AND PURPOSE OF ACTION

The Department of Natural Resources and Conservation (DNRC) proposes to harvest 2 to 3.5 million board feet (MMbf) of timber from portions of Sections 16, 25, and 36, Township 33 north, Range 26 west, located south of Trego, Montana (see *ATTACHMENT I – AREA MAPS*). Activities proposed would provide income for the Common School and Public Building trusts, regenerate new stands, and thin existing stands to improve the growth and vigor of the remaining forest stands through commercial and precommercial activities.

The lands involved in the proposed project are held in trust by the State of Montana for the support of specific beneficiary institutions, such as public schools, State colleges and universities, and other specific State institutions, such as the School for the Deaf and Blind (*Enabling Act of February 22, 1889*; *1972 Montana Constitution, Article X, Section 11*).

The Board of Land Commissioners (Land Board) and DNRC are legally required to administer these trust lands to produce the largest measure of reasonable and legitimate long-term return for these beneficiary institutions (*Section 77-1-202, Montana Codes Annotated [MCA]*). DNRC would manage the lands involved in this project in accordance with the *State Forest Land Management Plan (SFLMP)* (*DNRC 1996*) and the Administrative Rules for Forest Management (*Forest Management Rules*: Administrative Rules of Montana [*ARM] 36.11.401* through *456*), as well as other applicable state and federal laws.

*(*See *ATTACHMENT I - AREA MAPS*; *ATTACHMENT II - RESOURCE ANALYSES*; *ATTACHMENT III - PRESCRIPTIONS*; *ATTACHMENT IV – STIPULATIONS AND SPECIFICATIONS*.)

II. PROJECT DEVELOPMENT

1. PUBLIC INVOLVEMENT, AGENCIES, GROUPS, OR INDIVIDUALS CONTACTED:

Provide a brief chronology of the scoping and ongoing involvement for this project.

In May of 2008, DNRC solicited public participation on the Jim Beaver Timber Sale Project by advertising in the Tobacco Valley News, a weekly newspaper; posting the Initial Proposal at the Trego Post Office; and sending the Initial Proposal with maps to individuals, agencies, industry representatives, other organizations that have expressed interest in the management activities of Stillwater State Forest, and adjacent landowners. The mailing list developed for this project is located in the project file at the Stillwater Unit office.

The public comment period for the Initial Proposal was open for 30 days starting on May 7, 2008; 1 comment from the public, which was in favor of the project, was received.

In June 2008, the Interdisciplinary (ID) Team began to compile issues and gather information related to the current conditions. Hydrology, soils, wildlife, vegetative, and visual concerns were identified by DNRC resource specialists and field foresters for the No-Action and Action alternatives.

During the spring of 2009, within the context of public comments, continuing field reconnaissance, and specific resource concerns, the ID Team considered the need or benefit of developing additional alternatives. The ID Team determined that the issues directly related to the proposed actions could be addressed through minor changes in the project design and/or mitigation measures.

2. OTHER GOVERNMENTAL AGENCIES WITH JURISDICTION, LIST OF PERMITS NEEDED:

United States Forest Service (USFS)

- *Stewart/Butcher/Barnaby Federal Road and Trail Act (FRTA)*
- *Jim Creek Cost-Share*

Montana Department of Environmental Quality (DEQ)

A Short-Term Exemption from Montana's Surface Water Quality Standards (318 Authorization), which would be issued by DEQ, may be required if temporary activities would introduce sediment above natural levels into streams and if the Department of Fish Wildlife and Parks (DFWP) recommends it.

DNRC, classified as a major open burner by DEQ, is issued a permit from DEQ to conduct burning activities on state lands managed by DNRC. As a major open-burning permit holder, DNRC agrees to comply with the limitations and conditions of the permit.

Montana/Idaho Airshed Group

DNRC is a member of the Montana/ Idaho Airshed Group, which regulates prescribed burning, including both slash and broadcast burning, that is related to

DNRC's forest-management activities. As a member of the Airshed Group, DNRC agrees to burn only on days approved for good smoke dispersion as determined by the Smoke Management Unit in Missoula, Montana.

Department of Fish, Wildlife and Parks

A Stream Protection Act Permit (124 Permit) is required from the DFWP for activities that may affect the natural shape and form of a stream's channel, banks, or tributaries.

3. ALTERNATIVES CONSIDERED:

- ***No-Action Alternative***

  The No-Action Alternative is used as a baseline for comparing the effects the Action Alternative would have on the environment and is considered a possible alternative for selection. Under this alternative, no timber would be harvested and, thus, no revenue would be generated for the Common School or Public Building trusts at this time. Salvage logging, firewood gathering, recreational use, fire suppression, noxious-weed control, additional requests for permits and easements, and ongoing management requests may still occur. Natural events, such as plant succession, tree mortality due to insects and diseases, windthrow, down fuel accumulation, an in-growth of ladder fuels, and wildfires, would continue to occur.

- ***Action Alternative***

  Under the Action Alternative, 18 harvest units totaling approximately 553 acres would be commercially harvested. Approximately 82 of the 553 acres would be precommercially thinned to reduce the stocking density and improve the growth and vigor of the young stand of timber. A portion of a unit (approximately 20 acres) would be completed during winter, requiring frozen and/or snow-covered conditions. The remainder of the units may be completed under summer or winter conditions. Approximately 0.3 miles of new system road and 0.28 miles of temporary road would be constructed, 0.14 miles would be abandoned, and 10.35 miles would be maintained or have minor drainage improvements installed as necessary to protect water quality.

III. IMPACTS ON THE PHYSICAL ENVIRONMENT

- RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.
- Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.
- ***Enter "NONE" If no impacts are identified or the resource is not present.***

4. GEOLOGY AND SOIL QUALITY, STABILITY AND MOISTURE:

Consider the presence of fragile, compactable, or unstable soils. Identify unusual geologic features. Specify any special reclamation considerations. Identify any cumulative impacts to soils.

- ***Direct and Indirect Effects of the No-Action Alternative on Soils***

  No timber harvesting or associated activities would occur under this alternative. Skid trails from past harvesting would continue to recover from compaction as freeze-thaw cycles continue and vegetation root mass increases.

- ***Direct and Indirect Effects of the Action Alternative on Soils***

  To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. *ARM 36.11.422 (2)* and *(2)(a)* state that appropriate Best Management Practices (BMPs) shall be determined during project design and be incorporated into implementation. To ensure that the incorporated BMPs are implemented, the specific requirements would be incorporated into the *State of Montana Timber Sale Contract*. As part of this alternative design, the following BMPs are considered appropriate and, therefore, would be implemented during harvesting operations:

  1) Limit equipment operations to periods when soils are relatively dry, (less than 20 percent), frozen, or snow-covered to minimize soil compaction and rutting and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
  2) On ground-based units, the logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid-trail planning would identify which main trails to use and how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) would not be used and may be closed; additional drainage would be installed where needed or grass seed would be sown to stabilize the site and control erosion.
  3) Tractor skidding should be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive erosion. Steeper areas may require other methods such as adverse skidding to a ridge or winchline skidding from the more moderate slopes of less than 40 percent.
  4) Keep skid trails to 20 percent or less of the harvest-unit acreage.

Provide for drainage in skid trails and roads concurrently with operations.

5) Slash disposal - Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling on slopes over 35 percent; no excavator piling on slopes over 40 percent unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

6) Following harvesting operations, retain 10 to 15 tons of large woody debris and a majority of all fine litter feasible. On units where whole-tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid and evenly distribute slash within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

- ***Cumulative Effects of the Action Alternative to Soils***

  Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the *SFLMP*) through implementation of BMPs, skid-trail planning on tractor units, and limiting operations to dry or frozen conditions. Future harvesting opportunities would likely use the same road system, skid trails, and landing sites to reduce additional cumulative impacts. Large woody debris would be retained for nutrient cycling for long-term soil productivity.

  During an analysis of the project area, DNRC estimates that 60.8 acres of land may be impacted by skid trails and landings as part of this alternative; an additional 1.8 acres of ground would be removed from production or have reduced productivity due to road construction.

  By designing the proposed harvesting operations with soil-moisture restrictions, season of use, and method of harvesting, the risk of unacceptable long-term impacts to soil productivity from compaction and displacement would be low. Because the existing impact is below the goals recommended by the SFLMP and the action alternative would be expected to result in impacts below the recommended level, cumulative effects would likely remain below the 15-percent target.

Refer to *SOILS* in *ATTACHMENT II – RESOURCE ANALYSES* for more detailed information.

5. WATER QUALITY, QUANTITY AND DISTRIBUTION:

Identify important surface or groundwater resources. Consider the potential for violation of ambient water quality standards, drinking water maximum contaminant levels, or degradation of water quality. Identify cumulative effects to water resources.

- ***Direct and Indirect Effects of the No-Action Alternative to Water Resources***

  Sediment Delivery

  Under this alternative, no timber harvesting or related activities would occur. The existing direct sediment-delivery sources would continue until repaired by another project or funding source. In-channel sources of sediment would continue to exist and erode as natural events dictate.

  Water Yield

  No increase in water yield would be associated with this alternative.

- ***Direct and Indirect Effects of the Action-Alternative to Water Resources***

  Sediment Delivery

  Past monitoring of DNRC timber harvests has shown erosion on approximately 6 percent of the sites monitored, although no water-quality impacts from the erosion were found (*DNRC 2004*). These sites were harvested during the summer period and the erosion was attributed to inadequate skid-trail drainage. Monitoring of soil impacts from past DNRC timber sales have found that "winter logging resulted in minimal soil displacement. Displacement was limited to main skid trails that occupy less than 2% of the harvest units." (*DNRC 2004*). By minimizing displacement, less erosion would likely occur compared to other harvest methods with more extensive disturbance (*Clayton 1987* in *DNRC 2004*).

  No harvesting would occur within the Streamside Management Zone (SMZ) of Class 1 streams; additionally, no harvesting would occur within 100 feet of a fish-bearing stream. As per administrative rules (*ARM 36.11.304*), no equipment would be operated within the 50- or 100-foot SMZs.

  The proposed road construction does not include new stream crossings, although some work on the Jim Creek crossing would be implemented to augment a barrier to fish passage in an effort to protect the potentially pure-strain westslope cutthroat trout population. Some sediment would likely be released during the barrier augmentation; however, the sediment pulse would be short-lived and follow all rules associated with the required 124 Permit and 318-Authorization (short-term turbidity exemption). Effects of the short-term sediment pulse would likely provide discomfort to fish and potentially displace the fish for up to 1,000 feet downstream.

  All new and temporary road construction would occur well away from streams on soils that are suitable for road construction (*Kuennen and Nielsen-Gerhardt, 1995*). Because revegetation may be difficult on the road fill, erosion may occur, but due to the distance from streams, sediment delivery and subsequent water-quality impacts would not likely occur.

  Because postharvest water-yield levels under this alternative would remain

below the threshold where adverse impacts would be expected, only a low risk of increased in-channel sediment would result from this alternative. In-channel sources of sediment would be expected to continue to contribute sediment at the current rate because the water-yield increase would remain below the recommended threshold.

Because DNRC would incorporate BMPs into the project design as required by *ARM 36.11.422 (2)* and all laws pertaining to SMZs would be followed, a low risk of sediment from timber-harvesting activities would result from the implementation of this alternative. The risk of long-term adverse direct or indirect effects to water quality or beneficial uses, therefore, would be low.

Water Yield

If this alternative were selected, approximately 469 acres would be harvested using conventional ground-based methods and 82 acres would be precommercially thinned. Approximately 253 Equivalent Clearcut Acres (ECA) would be generated in the Beaver Creek watershed from these activities and 111 ECA would be generated in the Jim Creek watershed. The annual water yield in Beaver Creek would increase by 3.3 percent; Jim Creek would experience an annual water-yield increase of approximately 0.8 percent.

- ***Cumulative Effects Summary of the No-Action Alternative to Water Resources***

  Because no timber harvesting or associated activities would occur under this alternative, cumulative effects would be limited to the natural progression of the existing condition. Sediment sources would continue unless repaired under a separate project.

- ***Cumulative Effects Summary of the Action-Alternative to Water Resources***

  Because all timber-harvesting activities would follow BMPs as required by *ARM 36.11.422*, and the direct and indirect effects would have a low risk of impacts, a low risk of additional adverse cumulative effects would be expected to occur under this alternative.

  Because the annual water-yield increases would remain below the thresholds of concern and BMPs would be implemented during timber-harvesting and road-construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses, including fisheries habitat, would be low.

Refer to *WATER RESOURCE ANALYSIS* in *ATTACHMENT II – RESOURCE ANALYSES* for more detailed information.

6. AIR QUALITY:

What pollutants or particulate would be produced? Identify air quality regulations or zones (e.g. Class I air shed) the project would influence. Identify cumulative effects to air quality.

- ***Direct, Indirect, and Cumulative Effects of the No-Action Alternative on Air Quality***

  No timber harvesting or related activities, such as log hauling and the burning of slash piles, would occur under this alternative.

- ***Direct, Indirect, and Cumulative Effects of the Action-Alternative on Air Quality***

  During dry periods of the year, gravel, dirt, or native-surfaced roads cause dust relative to the amount of use. The log-hauling traffic from this proposed sale may increase by 6 to 12 truckloads of logs per day. Depending on the season of harvest and weather conditions, particulate production from road use may be elevated. During these periods of elevated particulate production, the application of dust abatement, such as magnesium chloride, may be required.

  The project area is located in Airshed 1. Some particulate matter may be introduced into the airshed from the burning of logging slash. Slash burning would be conducted when conditions favor good to excellent smoke dispersion; therefore, impacts are expected to be minor and temporary. Burning would be conducted during times of adequate ventilation and according to existing rules and regulations. Thus, direct, indirect, and cumulative effects to air quality are expected to be minimal.

7. VEGETATION COVER, QUANTITY, AND QUALITY:

What changes would the action cause to vegetative communities? Consider rare plants or covertypes that would be affected. Identify cumulative effects to vegetation.

Covertypes and Age Classes

- ***Direct and Indirect Effects of the No-Action Alternative to Covertypes and Age Classes***

  Neither covertypes nor age-class distributions in the analysis area would be directly or indirectly affected. Over time, lacking substantial disturbances such as timber harvests or wildfires, the proportion of seedling-/sapling-sized stands would gradually decrease.

- ***Direct and Indirect Effects of the Action-Alternative to Covertypes and Age Classes***

  - ***Beaver Creek***

    First, the mixed-conifer, lodgepole pine, and Douglas-fir/western larch covertypes (approximately 82 acres) or age classes would not change where the precommercial thinning treatments are proposed.

    In the areas where treatments are proposed within the mixed-conifer, lodgepole pine, Douglas-fir, or subalpine fir covertypes, approximately 159 acres would be converted to the Douglas-fir type (approximately 18 acres) or western

larch/Douglas-fir covertype (approximately 141 acres). In areas where treatment is proposed for the current western larch/Douglas-fir covertypes (approximately 170 acres), no changes would occur. Following regeneration, most of these treatments would result in 2-storied stands comprised primarily of western larch, Douglas-fir, and some ponderosa pine in the overstory and western larch, lodgepole pine, Englemann spruce, Douglas-fir, and subalpine fir in the understory. Overall, the Action Alternative would move stands in the proposed project area toward desired future conditions.

➢ ***Jim Creek***

In the area where treatment is proposed for the mixed-conifer or subalpine fir covertype, approximately 111 acres would be converted to the western larch/ Douglas-fir covertype. Following regeneration, most of these treatments would result in 2-storied stands, with the overstory comprised primarily of western larch and Douglas-fir and the understory made up of western larch, lodgepole pine, Englemann spruce, Douglas-fir, and subalpine fir. In areas where treatments are proposed for the current western larch/Douglas-fir covertypes (approximately 31 acres), no changes in covertype would occur. Overall, the Action Alternative would also move stands in the proposed project area toward desired future conditions.

Of the 553 acres to be harvested in both the Jim Creek and Beaver Creek proposal areas, no changes in age classes would occur due to the amount of older-aged trees being retained and DNRC's Stand Level Inventory (SLI) methodologies used to determine age class.

The proposed action alternative would mimic the effects of historic fire behavior, thus creating openings for wildlife, reducing the potential of high intensity wildfires, and regenerating stands toward desired future conditions.

- ***Cumulative Effects of the No-Action and Action Alternatives to Covertypes and Age Classes***

The cumulative effects of timber-stand management on Stillwater Unit trend toward increasing seral covertypes in the areas of recent forest-management activities.

Sensitive Plants

- ***Direct and Indirect Effects of the No-Action Alternative to Sensitive Plants***

No change is expected under this alternative. The sensitive plants are located near a segment of Beaver Creek that is several hundred feet from any road, so the risk of encroachment of noxious weeds is low. Also, since no change in canopy cover would be anticipated, the habitat would not be altered.

- ***Direct and Indirect Effects of the Action Alternative to Sensitive Plants***

The effects would be the same as the No-Action Alternative. No change would be expected since no harvesting within, at least, 100 feet of Beaver Creek is planned. Mitigation

measures used for noxious weeds would also decrease the risk of establishing noxious weeds in the project area as the result of harvesting activities.

- ***Cumulative Effects of the Action and No-Action Alternative to Sensitive Plants***

  Cumulative effects are expected to be similar to both the direct and indirect effects. Improved noxious-weed management, as well as increased use of mitigation measures, should reduce the spread of noxious weeds into habitats where sensitive plants occur.

Refer to *VEGETATION* in *ATTACHMENT II – RESOURCE ANALYSES* for more detailed information.

8. TERRESTRIAL, AVIAN AND AQUATIC LIFE AND HABITATS:
Consider substantial habitat values and use of the area by wildlife, birds, or fish. Identify cumulative effects to fish and wildlife.

The following were analyzed for in *WILDLIFE ANALYSIS* in *ATTACHMENT II – RESOURCE ANALYSES: Big Game Animals*, *Mature Forested Habitats and Connectivity*, and *Snags and Coarse Woody Debris*. Refer to the *WILDLIFE ANALYSIS* for more-detailed information.

FISHERIES

- ***Direct and Indirect Effects of the No-Action Alternative to Fish Habitat Parameters***
  - ***Large Woody Debris Recruitment***

    No reduction in recruitable large woody debris would result from the implementation of this alternative.
  - ***Stream Temperature***

    No increases in stream temperature from a reduction in stream shading would be expected under this alternative.
  - ***Fish Passage***

    No changes to fish passage in the Beaver Creek or Jim Creek parcel would occur. While the Beaver Creek site currently passes all life forms at all flows, the Jim Creek site would continue to only pass adult fish. No barrier augmentation would be implemented, which may result in additional risk of hybridized westslope cutthroat trout.
- ***Direct and Indirect Effects of the Action Alternative to Fish Habitat Parameters***
  - ***Large Woody Debris Recruitment***

    As described earlier, no harvesting would occur within 100 feet of fish-bearing streams. Because the existing recruitable large woody debris would not be removed as part of the sale, a very low potential of direct adverse impacts would result. However, postharvest windthrow may be increased, which could slightly increase the channel complexity (*Bower 2009*).
  - ***Stream Temperature***

    Harvesting would occur outside of the 100-foot buffers along fish-bearing streams . Because stream shading would not be reduced

within the 100-foot buffer along fish-bearing streams and within the 50-foot buffer of all other streams, the risk of increasing stream temperatures due to timber harvesting would be very low.

– ***Fish Passage***

No changes to fish passage in the Beaver Creek parcel would occur. The site currently passes all life forms at all flows.

This crossing on Jim Creek (site #924) would have the barrier augmented at the outlet to reduce the risk of genetic degradation in the potentially pure-strain westslope cutthroat trout population in the upper reaches of Jim Creek.

- ***Cumulative Effects Summary of the No-Action Alternative to Fisheries***

  The quality of fisheries habitat would be maintained at its current level with a low degree of risk of change due to anthropogenic sources. A risk to the potentially pure-strain westslope cutthroat trout population would result because the barrier augmentation would not be implemented.

- ***Cumulative Effects Summary of the Action Alternative to Fisheries***

  Fisheries habitat quality would also be maintained at its current level, with a low degree of risk of change due to anthropogenic sources. The barrier-augmentation project would reduce the risk of hybridization of the potentially pure-strain westslope cutthroat trout population in upper Jim Creek.

9. UNIQUE, ENDANGERED, FRAGILE, OR LIMITED ENVIRONMENTAL RESOURCES:
Consider any federally listed threatened or endangered species or habitat identified in the project area. Determine effects to wetlands. Consider Sensitive Species or Species of Special Concern. Identify cumulative effects to these species and their habitat.

The following endangered or sensitive species exist and were analyzed for in the project area: grizzly bear, gray wolf, Canada lynx, fisher, flammulated owl, and pileated woodpecker. Most species will experience minor to no effect from the project. Refer to *WILDLIFE ANALYSIS* in *ATTACHMENT II – RESOURCE ANALYSES* for more-detailed information.

10. HISTORICAL AND ARCHAEOLOGICAL SITES:
Identify and determine effects to historical, archaeological, or paleontological resources.

The project area has been inspected for cultural resources by DNRC archaeologists and no further investigation was deemed necessary. However, a clause in the *State of Montana Timber Sale Contract* would provide for suspended operations if cultural resources were discovered; operations would only resume as directed by the Forest Officer.

11. AESTHETICS:

Determine if the project is located on a prominent topographic feature, or may be visible from populated or scenic areas. What level of noise, light, or visual change would be produced? Identify cumulative effects to aesthetics.

- ***Direct, Indirect, and Cumulative Effects of the No-Action Alternative***

  No timber harvesting or related activities would occur. No changes in views would occur.

- ***Direct, Indirect, and Cumulative Effects of the Action Alternative***

  Portions of the project area, specifically the eastern portions of Units 16.3 and 16.4, would be visible from USFS Road 36. Skid trail layout designed to minimize visual impacts, variations in spacing of the trees retained in the units, and unit boundaries with variable numbers of leave trees would help minimize the visual impacts. Until regeneration has reached the point of canopy closure again, the visual impacts would be greater in winter months when snow on the ground would make the openings more visible. The harvest prescriptions and buffer strips along the main roads would minimize the visual impacts.

12. DEMANDS ON ENVIRONMENTAL RESOURCES OF LAND, WATER, AIR, OR ENERGY:

Determine the amount of limited resources the project would require. Identify other activities nearby that the project would affect. Identify cumulative effects to environmental resources.

No direct, indirect, or cumulative impacts would likely occur under either alternative.

13. OTHER ENVIRONMENTAL DOCUMENTS PERTINENT TO THE AREA:

List other studies, plans, or projects on this tract. Determine cumulative impacts likely to occur as a result of current private, state, or federal actions in the analysis area, and from future proposed state actions in the analysis area that are under MEPA review (scoped) or permitting review by any state agency.

- *Trego Environmental Analysis (USFS, May 1996)*
- *Swamp Creek Environmental Impact Statement (EIS) (USFS)*
- *Old Highway Environmental Analysis (EA) (April 2006)*

Also see references posted in *ATTACHMENT II - RESOURCE ANALYSES*.

IV. IMPACTS ON THE HUMAN POPULATION

- RESOURCES potentially impacted are listed on the form, followed by common issues that would be considered.
- Explain POTENTIAL IMPACTS AND MITIGATIONS following each resource heading.
- ***Enter "NONE" if no impacts are identified or the resource is not present.***

14. HUMAN HEALTH AND SAFETY:
Identify any health and safety risks posed by the project.

No unusual safety considerations are associated with the proposed timber sale.

15. INDUSTRIAL, COMMERCIAL, AND AGRICULTURE ACTIVITIES AND PRODUCTION:
Identify how the project would add to or alter these activities.

The proposed timber harvest would provide continued industrial production in the region.

16. QUANTITY AND DISTRIBUTION OF EMPLOYMENT:
Estimate the number of jobs the project would create, move, or eliminate. Identify cumulative effects to the employment market.

People are employed in the wood-products industry in the region. Due to the relatively small size of the timber sale program, no measurable direct, indirect, or cumulative effects to the employment market would be likely.

17. LOCAL AND STATE TAX BASE AND TAX REVENUES:
Estimate tax revenue the project would create or eliminate. Identify cumulative effects to taxes and revenue.

Due to the relatively small size of the proposed timber sale, no measurable direct, indirect, or cumulative impacts to the tax base or tax revenue would be likely from either alternative.

18. DEMAND FOR GOVERNMENT SERVICES:
Estimate increases in traffic and changes to traffic patterns. What changes would be needed to fire protection, police, schools, etc.? Identify cumulative effects of this and other projects on government services.

Log trucks hauling to the purchasing mill would result in temporary increases in traffic on U.S. Highway 93 and USFS Roads 35, 36, or 48. This increase is a normal contributor to the activities of the local community and would not be considered a new or increased source of traffic.

19. LOCALLY ADOPTED ENVIRONMENTAL PLANS AND GOALS:

List State, County, City, USFS, BLM, Tribal, and other zoning or management plans, and identify how they would affect this project.

On May 30, 1996, DNRC released the *Record of Decision* on the *SFLMP*. The Land Board approved the implementation of the *SFLMP* on June 17, 1996. On March 13, 2003, the Department adopted *Administrative Rules (Rules) (ARM 36.11.401* through *450*). The *SFLMP* outlines the management philosophy, and the proposal will be implemented according to the *Rules*. The philosophy is:

"Our premise is that the best way to produce long-term income for the trust is to manage intensively for healthy and biologically diverse forests. Our understanding is that a diverse forest is a stable forest that will produce the most reliable and highest long-term revenue stream… In the foreseeable future, timber management will continue to be our primary source of revenue and our primary tool for achieving biodiversity objectives."

20. ACCESS TO AND QUALITY OF RECREATIONAL AND WILDERNESS ACTIVITIES:

Identify any wilderness or recreational areas nearby or access routes through this tract. Determine the effects of the project on recreational potential within the tract. Identify cumulative effects to recreational and wilderness activities.

The hunting of game animals, berry picking, and other forest recreational activities are common in the area. The Beaver Creek section has 0.25 mile of spur road that is currently designated open, but would be restricted postharvest. This road accesses only the immediate area, and the abandonment would not affect the ability of people to recreate in the project area. Illegal off-road vehicle use is expected to decrease, while legal use is expected to remain about the same with the Action Alternative. Recreational activities are expected to continue under either alternative.

21. DENSITY AND DISTRIBUTION OF POPULATION AND HOUSING:

Estimate population changes and additional housing the project would require. Identify cumulative effects to population and housing.

This proposal will have no measurable direct, indirect, and cumulative impacts related to population and or housing.

22. SOCIAL STRUCTURES AND MORES:

Identify potential disruption of native or traditional lifestyles or communities.

No direct, indirect, and cumulative impacts related to social structures and mores would be expected under either alternative.

23. CULTURAL UNIQUENESS AND DIVERSITY:

How would the action affect any unique quality of the area?

No direct, indirect, and cumulative impacts related to cultural uniqueness and diversity would be expected under either alternative.

24. OTHER APPROPRIATE SOCIAL AND ECONOMIC CIRCUMSTANCES:

Estimate the return to the trust. Include appropriate economic analysis. Identify potential future uses for the analysis area other than existing management. Identify cumulative economic and social effects likely to occur as a result of the proposed action.

Costs, revenues, and estimates of return are estimates intended for relative comparison of alternatives. They are not intended to be used as absolute estimates of return. The estimated stumpage is based on comparable timber sales analysis. This method compares tree species, quality, average diameter, product mix, terrain, date of sale, distance from mills, road building and logging systems, terms of sale, or anything that could affect the willingness of a potential buyer to find the market value for stumpage.

Assuming 2.2 to 2.6 MMbf would be harvested, the effect of the proposed Action Alternative would generate a return of approximately $400,000 to $620,000 to the various trusts.
The No-Action Alternative would generate no return to the trusts at this time.

EA Checklist Prepared by:	**Name:** Jason Glenn **Title:** Management	**Date:** November 15, 2009

V. FINDING

25. ALTERNATIVE SELECTED:

Upon review of the Checklist EA and attachments, I find the Action Alternative, as proposed, meets the intent of the project objectives as stated in Section I – *Type and Purpose of Action*. The lands involved in this project are held by the State of Montana in trust for the support of specific beneficiary institutions and DNRC is required by law to administer these trust lands to produce the largest measure of reasonable and legitimate return over the long run (*Enabling Act of February 22, 1889; 1972 Montana Constitution, Article X Section 11;* and, *77-1-212 MCA*). The Action Alternative complies with all pertinent environmental laws, the *DNRC SFLMP*, and a consensus of professional opinion on limits of acceptable environmental impact. For these reasons, I have selected the Action Alternative to be implemented on this project.

26. SIGNIFICANCE OF POTENTIAL IMPACTS:

After a review of the scoping documents, Department policies, standards, guidelines, SFLMP, and Forest Management Rules, I find that all of the identified resource management concerns have been fully addressed in this *Checklist EA* and its attachments. Specific project design features and various recommendations of the resource management specialists have been implemented to ensure that this project will fall within the limits of acceptable environmental change. Taken individually and cumulatively, the proposed activities are common practices, and no project activities are being conducted on important fragile or unique sites. I find there will be no significant impacts to the human environments as a result of implementing the Action Alternative. In summary, I find that the identified adverse impacts will be controlled, mitigated, or avoided by the design of the project to the extent that the impacts are not significant.

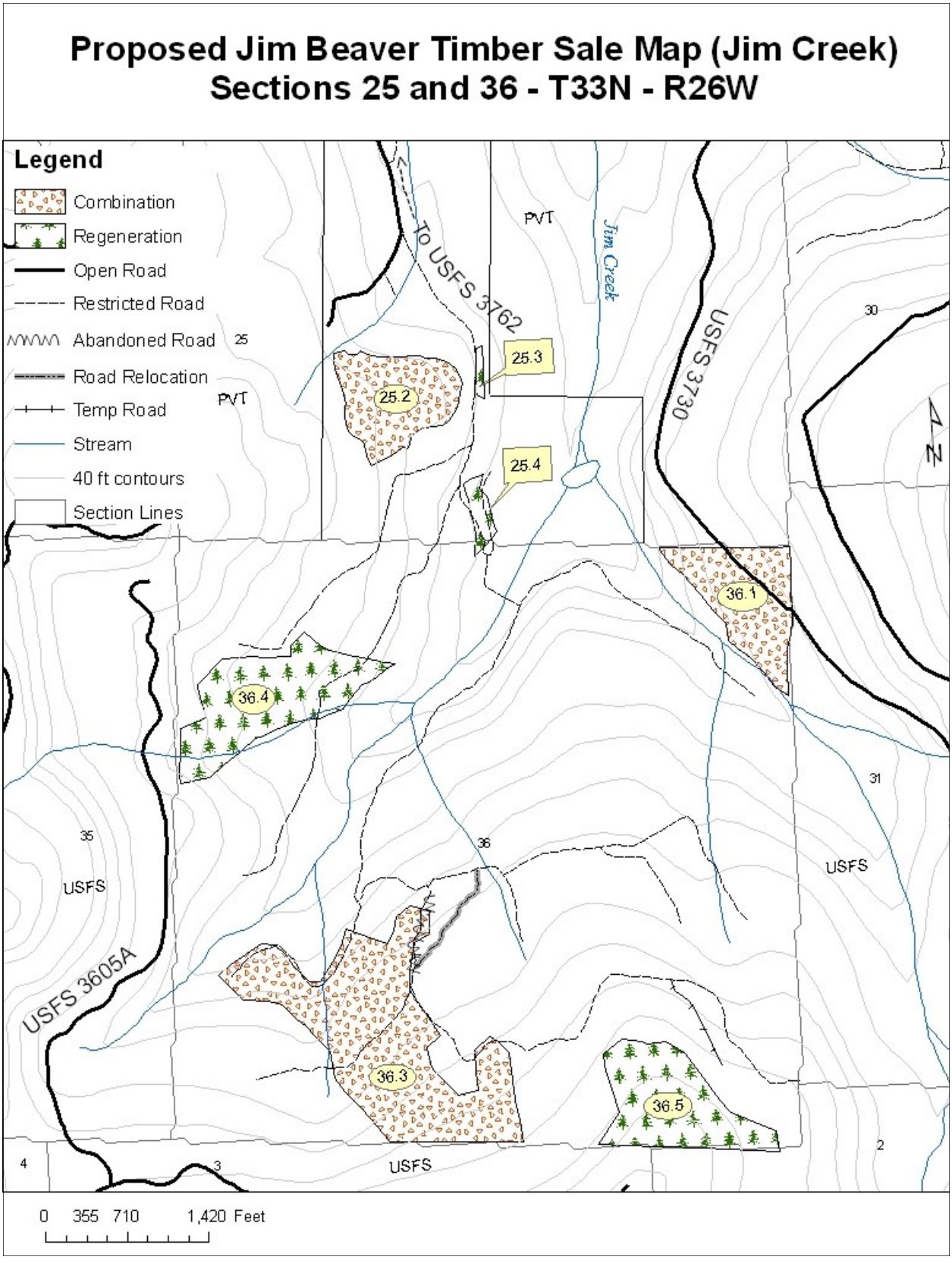
27. NEED FOR FURTHER ENVIRONMENTAL ANALYSIS:

	EIS		More Detailed EA	X	No Further Analysis

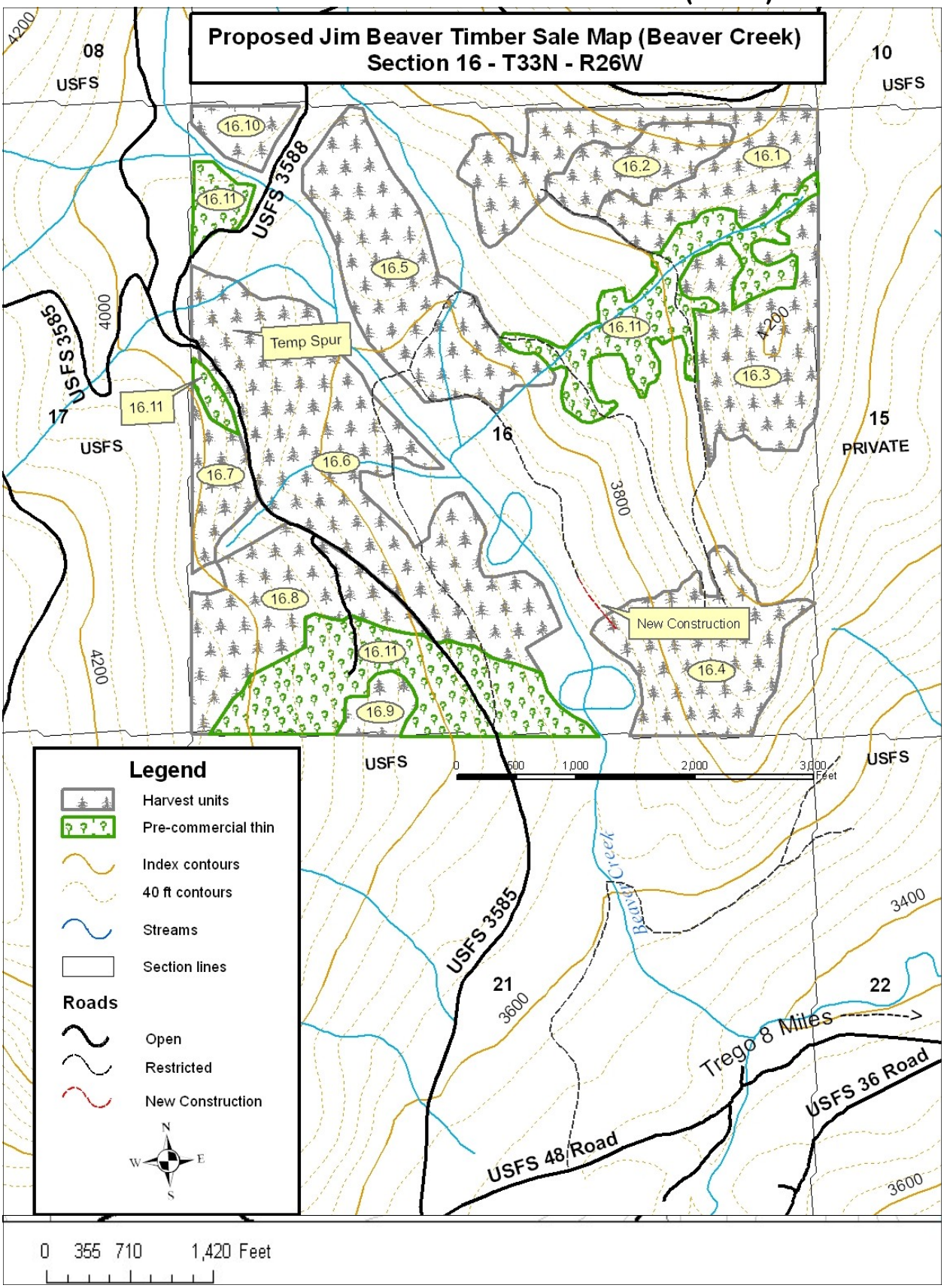
EA Checklist Approved By: **Name:** Michael J. McMahon
Title: Forest Management Supervisor

Signature: **/s/ Mike McMahon** **Date:** **12/23/09**

ATTACHMENT I - HARVEST AREA MAPS (1 of 2)



ATTACHMENT I - HARVEST AREA MAPS (2 of 2)



ATTACHMENT II-A
VEGETATION ANALYSIS

INTRODUCTION

This section describes conditions of the existing vegetation on Stillwater Unit as a whole, in the project area specifically, and how the No-Action and Action alternatives would affect the various components of this resource. A number of vegetation parameters could be affected by implementing the alternatives; therefore, each will be analyzed. Forest covertypes and age-class distributions will be discussed at the landscape and stand levels to facilitate the analysis of direct, indirect, and cumulative effects. Forest insects, diseases, forest fuels, noxious-weed conditions, and sensitive plants will be discussed at the project-area level. Past, present, and reasonably foreseeable activities are identified and considered in the analysis of cumulative effects.

ANALYSIS METHODS

The *Forest Management Rules* direct DNRC to promote biodiversity by taking a coarse-filter approach that favors an appropriate mix of stand structures and composition on state lands *(ARM 36.11.404)*. Static ecological parameters, including landtype, climatic section, habitat type, disturbance regime, and other unique characteristics, influence the forest communities that occur in a given area and provide a basis for determining and managing for appropriate structures and composition. Dynamic characteristics of forest communities, such as species composition, age-class distribution, covertype, and stand structure, reflect the ecological parameters influencing a site and describe the resulting biodiversity in an area. The effects of an action on these characteristics describe the contribution of the action toward promoting biodiversity.

To assess the existing condition of the project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, and consultations with other professionals provided information for the analysis.

The current covertype distribution was compared to DNRC's desired future conditions. The Stillwater Stand SLI, specifically *STW SLI_2008*, was used to describe current covertypes. DNRC's desired future conditions refer to the covertype that DNRC attempts to manage toward in a forest stand. Desired future conditions are determined according to the model described in *ARM 36.11.405*. DNRC's desired future conditions have been delineated in the Forest Management Bureau's *Desired Future Condition DATASET*. This information is available at the Stillwater Unit office in Olney. *STW SLI_2008* was used to address the cumulative effects on covertype and age-class distributions.

Historic age-class distributions described by *Losensky (1997)* for climatic section M333C, which represents Upper Flathead Valley, were compared to the current age-class distribution on Stillwater Unit

ANALYSIS AREA

The analysis area used to assess direct and indirect effects to forest vegetation includes the 3 sections in the project area. Environmental effects to noxious weeds, sensitive plants, forest fuels, and insects and diseases were also assessed on the 3 sections

in the project area and haul routes to the county road.

The analysis area used to assess the cumulative effects to covertypes, age classes, and old growth includes all DNRC-managed lands on Stillwater Unit. Stillwater Unit administers Stillwater State Forest, Coal Creek State Forest, most of the scattered lands north of Coal Creek State Forest in Flathead County, and the northeastern portion of Lincoln County.

EXISTING CONDITION

COVERTYPES AND AGE CLASSES

Covertype refers to the dominant tree species that currently occupy a forested area. *TABLE II-A-1 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)* illustrates the current proportions of forest covertypes compared to desired future conditions.

Data indicates (*TABLE II-A-1 - THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT [BY PERCENT])*, that mixed-conifer and subalpine fir stands are currently overrepresented compared to DNRC's desired future conditions. Many of the species that make up the mixed-conifer and subalpine covertypes are shade tolerant, and stand structure tends to be multistoried. The multistoried structure has resulted, in part, from the ingrowth of shade-tolerant trees over time. Therefore, the component of shade-tolerant species increases as the

TABLE II-A-1 – THE CURRENT AND DESIRED FUTURE CONDITIONS OF COVERTYPES ON FORESTED LAND ADMINISTERED BY STILLWATER UNIT (BY PERCENT)

COVERTYPE	CURRENT (PERCENT)	DESIRED FUTURE CONDITION COVERTYPE (PERCENT)
Douglas-fir	3.5	1.4
Subalpine fir	27.0	16.3
Lodgepole pine	11.0	9.9
Ponderosa pine	0.8	1.7
Mixed conifer	25.9	6.5
Western larch/Douglas-fir	24.7	47.4
Western white pine	2.5	14.8
Hardwoods	3.0	3.1
Area that does not have a covertype designated in the SLI*	4.3	

**A major portion of those stands not inventoried with a covertype are stands that were involved in the stand-replacement fires of the Moose Fire of 2001; at the time of data collection in 2001 and 2002, these areas were nonstocked. Since the fire and salvage harvest, reconnaissance shows that many areas are regenerating to the early successional covertypes of primarily lodgepole pine or western larch/Douglas-fir.*

interval between disturbances, such as wildfires or timber harvests, is lengthened.

The western larch/Douglas-fir and western white pine covertypes are currently underrepresented on the forest compared to the desired future condition covertype distribution. Western larch and western white pine are not shade tolerant and have, historically, been perpetuated through fairly intensive disturbances such as wildfires. These disturbances most often created single- and two-storied stands of primarily western larch and Douglas-fir overstories and western larch, western white pine, and Douglas-fir understories. While western larch is not shade tolerant, past silvicultural treatments have promoted multistoried western larch/Douglas-fir stands with numerous age classes represented in small groups of trees within larger stands. Additionally, the white pine blister rust infection has drastically affected the western white pine covertype by substantially reducing over several decades the number of healthy western white pine that occupies the canopy as overstory dominants.

Age-class distributions delineate another characteristic important for determining trends on a landscape level. Comparing the entire Stillwater Unit's administrative area with historical data for the Upper Flathead Valley climatic section (*Losensky [1997])*, *TABLE II-A-2 – DISTRIBUTION OF AGE CLASSES* shows that Stillwater Unit currently has proportionately less area in the 0-to-39-year (seedling/sapling stands) and 100-to-150-year age classes, and higher proportions of areas in the 40-to-99-year and greater-than-150-year age classes. DNRC's Forest Management Rules reflect the ecological principle that age-class distributions are not static and are dependent upon disturbances, whether those are natural or implemented by man through silvicultural practices.

A fairly clear picture emerges of the forest conditions when distributions are combined with information on covertypes as displayed in *TABLE II-A-3 – AGE-CLASS DISTRIBUTION OF CURRENT COVERTYPES ON STILLWATER UNIT*.

As was noted in *TABLE II-A-2 - DISTRIBUTION OF AGE CLASSES*, current

TABLE II-A-2 – DISTRIBUTION OF AGE CLASSES

AGE CLASS	HISTORIC PERCENT IN CLIMATIC SECTION M333C	HISTORIC ESTIMATES OF PERCENT ON STILLWATER UNIT	CURRENT PERCENT
0-to-39-year	36	22.8	13.6
40-to-99-year	12	17.9	22.8
100-to-150-year	22	24.7	13.8
150+-year	29	32.8	45.8
No age provided in SLI*			3.9
**A major portion of these stands were partially burned in the Moose Fire of 2001; SLI updates in 2001 and 2002*			

TABLE II-A-3 - AGE-CLASS DISTRIBUTION OF CURRENT COVERTYPES ON STILLWATER UNIT

CURRENT COVERTYPE	AGE CLASS					
	0 TO 39 YEARS	40 TO 99 YEARS	100 TO 149 YEARS	150 YEARS AND OLDER	NO AGE DATA	TOTAL ACRES
	NUMBER OF ACRES					
Douglas-fir	94	420	577	2,349	666	4,106
Hardwoods	100	122	68	64	0	354
Lodgepole pine	2,713	8,578	318	407	973	12,989
Mixed conifer	3,474	6,666	4,523	15,478	375	30,516
Ponderosa pine	170	0	531	192	0	893
Subalpine fir	3,992	6,514	4,112	16,735	376	31,729
Western larch/ Douglas-fir	522	4,247	6,198	16,105	2,076	29,147
Western white pine	360	198	325	2,019	0	2,902
Nonstocked	4,939	0	0	0	0	4,939
Total Acres (total percent)	16,364 (13.6)	26,745 (22.8)	16,652 (13.8)	53,349 (45.8)	4,466 (3.9)	117,578

age-class distributions are predominately in the oldest age class. The stand structure of the older age classes tend to be multistoried; this occurs when a stand has progressed through time and succession to the point that shade-tolerant species, such as grand fir, Engelmann spruce, and subalpine fir, are replacing a shade-intolerant overstory, such as western larch.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Covertypes and Age Classes***

  Neither covertypes nor age-class distributions in the analysis area would be directly or indirectly affected. Over time, lacking substantial disturbances such as timber harvests or wildfires, the proportion of seedling-/sapling-sized stands would gradually decrease.

- ***Direct and Indirect Effects of the Action Alternative to Covertypes and Age Classes***

  Lodgepole pine and ponderosa pine covertypes or age classes would not change where treatments are proposed.

  In the areas where treatments are proposed for the mixed-conifer, lodgepole pine, Douglas-fir, or subalpine fir covertypes, approximately 159 acres would be converted to the western larch/ Douglas-fir covertype (approximately 141 acres) or Douglas-fir type (approximately 18 acres). In areas where treatment is proposed for the current western larch/

Douglas-fir covertypes (approximately 170 acres), no changes would occur. Following regeneration in 3 to 7 years, most of these treatments would result in 2-storied stands comprised primarily of western larch and Douglas-fir in the overstory and western larch, lodgepole pine, Englemann spruce, Douglas-fir, and subalpine fir in the understory. Overall, the Action Alternative would move stands in the proposed project area toward the desired future conditions.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative to Covertypes and Age Classes***

  The cumulative effects of timber-stand management on Stillwater Unit trend toward increasing seral covertypes in the areas of recent forest-management activities.

  It should be noted that in addition to the changes in covertype distributions from the proposed action, the stands involved in the stand-replacement fires of the 2001 Moose Fire have not been inventoried. Other timber sale projects have been initiated since the compilation of the *STW 2006 SLI*; several are reflected in the *STW 2008 SLI*, but not all. The timber sale projects that have been designed or sold since the *STW 2006 SLI* increase the amount of the western larch/Douglas-fir covertype over the analysis area and, subsequently, reduce the amount of area in the mixed-conifer and subalpine fir covertypes. The *STW 2008 SLI* shows a 0.4 -percent increase in the amount of the 0-to-30-year age class and a 0.5-percent reduction in the 150-year age class, approximate changes of 450 acres and 550 acres, respectively, with 3 timber sales. These projects are estimated to increase the amount of area in the 0-to-39-year age class by slightly decreasing the area in the older stand age classes. Furthermore, Stillwater Unit has a precommercial thinning program that often favors the retention of western larch and western white pine saplings; in some cases, this changes a mixed-conifer or lodgepole pine covertype to a western larch or western white pine covertype.

- ***Cumulative Effects of the Action Alternative to Covertypes and Age Classes***

  Under this alternative, cumulative effects to age classes would be similar to the No-Action Alternative, while cumulative effects to covertypes would result in a greater increase in seral covertypes in the cumulative-effects analysis area.

INSECTS AND DISEASES

EXISTING CONDITIONS

- **Beaver Creek**

  The Beaver Creek portion of the project area is showing some incidence of Douglas-fir beetles (*Dendroctonus pseudotsugae*), *Armillaria* root disease, Pini rot (*Phellinus pini*), and Indian paint fungus (*Echinodontium tinctorium* E. & E.). In the last 5 years, some mortality has occurred in Douglas-fir due to Douglas-fir beetles. Diseases such as Pini rot and Indian paint fungus have resulted in loss of value in some merchantable trees.

- **Jim Creek**

  The Jim Creek portion of the project area is showing some incidence of Douglas-fir beetles (*Dendroctonus pseudotsugae*), *Armillaria* root disease, Pini rot (*Phellinus pini*), larch needle blight (*Hypodermella laricis*), and western spruce budworm (*Choristoneura occidentalis*). Negligible

amounts of mortality have occurred in Douglas-fir due to Douglas-fir beetles. Some blowdown and mortality has occurred due to Armillaria root disease. Pini rot has resulted in a loss of value in infected merchantable trees. The larch needle blight and western spruce budworm infestations are too recent to observe impacts that may result in long-term damage.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Insects and Diseases***

  In general, insect populations would continue to rise or fall based on natural disturbances or climatic conditions. The potential for an increase in Douglas-fir beetle attacks exists if Douglas-fir were damaged by wind events and/or stem breakage, or as mature trees continue to advance in maturity and vigor declines. Increased mortality in the project area may occur, and loss of value due to stem decay may increase. Repeated defoliation by the western spruce budworm could cause growth loss and mortality of infested trees.

- ***Direct and Indirect Effects of the Action Alternative to Insects and Diseases***

  Insect populations would continue to rise or fall based on natural disturbances or climatic conditions. The increased vigor of new regeneration and species being retained for seedtrees, primarily western larch and Douglas-fir, would improve long-term resistance to insect and disease problems.

  In the Beaver Creek units, seedtree harvests would reduce the amount of trees susceptible to Douglas-fir bark beetle infestations on approximately 213 acres. The mature trees retained in SMZs and other no-cut areas may blow down and maintain a small beetle population for several years.

  In the Jim Creek units, harvesting activities would reduce the number of Douglas-fir trees susceptible to Douglas-fir bark beetle infestations on approximately 57 acres. Harvesting tree species susceptible to *Armillaria* root disease and regenerating trees that are more resistant to this root disease would lessen instances of attack in future stands. Temporarily converting stands to a single-storied structure would reduce western spruce budworm infestations. Harvesting would have no effect on larch needle blight.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative to Insects and Diseases***

  The current trend in mortality, infection, and infestation levels in mature stands throughout Stillwater Unit would continue. Increases in insect infestations and disease infections could be expected in mature timber stands that are more densely stocked, lower in vigor, and contain increased levels of blown-down timber. Managed stands would be less likely to be adversely impacted by insect infestations and disease outbreaks.

- ***Cumulative Effects of the Action Alternative to Insects and Diseases***

  The condition in the timber stands after harvesting would be less conducive to mortality and loss of value from insect and disease attacks since the proposed action would reduce stocking density and increase vigor. Western larch, Douglas-

fir, and ponderosa pine regeneration would be promoted and managed for the long-term, thereby improving resistance to insect and disease problems on those areas being harvested.

FOREST FUELS AND FIRE REGIMES

EXISTING CONDITIONS

Timber management, fire suppression, and the subsequent stand development have influenced the amount and distribution of fuels on these various stands in the project area. Stands in the project area have developed a high number of stems per acre and several levels of canopy. Under these forest conditions, fires can reach the upper canopy levels through the available ladder fuels, causing torching and, under some conditions, resulting in crown fires.

Fisher and Bradley (1987), Fire Ecology of Western Montana Habitat Types, described the fire ecology of habitat-type groups in Montana. The fire groups present in the Jim/ Beaver project area are summarized in *TABLE II-A-4 – CHARACTERISTICS OF FIRE GROUPS OCCURRING WITHIN THE JIM BEAVER PROJECT AREA.*

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Forest Fuels***

  Stands would continue to retain ladder fuels and dense stands until disturbance, man-caused or natural, occurs. Risk of torching and crown fires would remain high. Over time, increased fuel loading would be expected to increase the risk of fires as described above.

- ***Direct and Indirect Effects of the Action Alternative to Forest Fuels***

  Areas treated with the seedtree treatment would retain approximately 10 to 15 tons per acre of large woody debris following site-preparation treatments. Ladder fuels to crowns would be removed in the proposed harvest units and the fuel treatments would result in reduced fire

TABLE II-A-4 – CHARACTERISTICS OF FIRE GROUPS OCCURRING WITHIN THE JIM BEAVER PROJECT AREA

	FIRE GROUP			
	6	**7**	**8**	**9**
Habitat type group	Moist Douglas-fir	Cool types dominated by lodgepole pine	Dry lower subalpine	Moist lower subalpine
Percent of project area	16	12	3	69
Fire return interval/ severity	Frequent/low to moderate	Frequent/low to infrequent/high	Frequent to infrequent/mixed	Infrequent/mixed
Average fuel loading (tons/acre)	12	18	18	25
Postharvest fuel loading (tons/acre)	10 to 15	10 to 15	10 to 15	10 to 15

intensity under most circumstances. The success of aerial and ground attacks on wildfires would likely be improved because potentially occurring fires would be more likely to burn along the ground rather than climbing into the overstory.

Areas treated with commercial-thin treatments would reduce the amount of trees and, consequently, fuel loads, resulting in less intense fires than would occur in unthinned stands. However, the connectivity of fuel and ladder fuels may not be impacted. Additionally, thinning may result in increased air flow through the stand, which could promote the drying of fuels on the forest floor and increased rates of spread for fires that do occur.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative to Forest Fuels***

  Under this alternative, no changes would occur except the fuel reductions that would occur with firewood cutting along open roads.

- ***Cumulative Effects of the Action Alternative to Forest Fuels***

  In addition to the actions displayed under the *Cumulative Effects of the No-Action Alternative to Forest Fuels*, 553 acres would be treated and the slash and fuel loading would be reduced to meet Montana's *Hazard Reduction Law.*

  Due to the location of proposed harvest units, reduced fuel loads, and the reduced amount of canopy, the success of aerial and ground attacks on wildfire would likely be improved.

NOXIOUS WEEDS

EXISTING CONDITIONS

A noxious weed is defined as a nonnative plant competing with desirable plants for nutrients, water, and sunlight and is harmful to agriculture, wildlife, forestry, and other beneficial uses, thus reducing the value and productivity of the land. Most noxious weeds are exotic species, originating in Eurasia (*Lincoln County Weed-Management Plan*). Montana has declared 15 weeds noxious; Lincoln County has added 10 to their *Noxious Weed Management* list. The following weeds have been located on DNRC-managed land and along access routes to the project area:

- spotted knapweed (*Centraurea maculosa*)
- oxeye daisy (*Chrysanthemum leucanthemem*)
- orange hawkweed (*Hieracium aurantiacum*)

The first 2 species listed are Category 1 weeds, which are established weeds with high disbursements; orange hawkweed is a Category 2 weed, which is established, but has a moderate disbursement level. These invading weed species are not new to Lincoln County; new invading weed species would be listed as Category 3 weeds.

Spotted knapweed and oxeye daisy, the most widely distributed noxious weeds in the project area and on Stillwater State Forest, are found in areas where ground disturbances such as landings, skid trails, powerlines, and roadsides occur.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Noxious Weeds***

  Additional mineral soil would not be exposed and heavy tree canopies would continue to compete with weeds; therefore, the risk of additional establishment of weed populations would not increase where motorized use is restricted. Currently, the project area is used for dispersed recreation, and weed seed is introduced primarily from motor vehicle use. Established infestations of noxious weeds are being addressed with an ongoing program of site-specific herbicide spraying along roads and in small areas of infestation.

- ***Direct and Indirect Effects of the Action Alternative to Noxious Weeds***

  The proposed activities would result in an increase in ground disturbance. Mechanized equipment and ground disturbance could increase or introduce noxious weeds along roads and throughout forested areas. Weed seeds are likely to be scattered throughout the forested areas, and the reduction of canopy and resulting disturbance from the timber-harvesting activities are expected to provide the catalyst for spread. Mitigation measures that would reduce the spread of weed seeds and noxious weeds include:

  - washing equipment before entering the site,
  - sowing grass seed on roads after harvesting has been completed, and
  - applying herbicide applications along roadsides and on spots of weed outbreaks.

Cumulative Effects

- ***Cumulative Effects of the No-Action Alternative to Noxious Weeds***

  Open roads in the project area have traffic from dispersed recreation, timber-management activities, and other uses on a regular basis. These disturbances , along with illegal motorized use ,increase exposure to weed establishment. Over time, the weed-management program at Stillwater Unit, including cooperation with the USFS and weed departments of Flathead and Lincoln counties, has improved and more weed control is taking place

- ***Cumulative Effects of the Action Alternative to Noxious Weeds***

  This alternative will be similar to the *Cumulative Effects of the No-Action Alternative to Noxious* Weeds, but with a slightly higher risk of weeds becoming established.

SENSITIVE PLANTS

EXISTING CONDITIONS

The *Montana Natural Heritage Program (MTNHP)* was consulted in the winter of 2008. Their database showed an elemental occurrence of wavy moonwart (*botrychium crenulatum*) within the project area, which were observed last in June 1995; at that time approximately 100 plants existed. In Montana, this plant is ranked as being potentially at risk because of limited and/or declining numbers, range, and/or habitat, even though it may be abundant in some areas.

ENVIRONMENTAL EFFECTS

Direct and Indirect Effects

- ***Direct and Indirect Effects of the No-Action Alternative to Sensitive Plants***

  No change is expected under this alternative. The plants are located near a segment of Beaver Creek that is several hundred feet from any road, so the risk of encroachment of noxious weeds is low. Also, since no change in canopy cover would be anticipated, the habitat would not be altered.

- ***Direct and Indirect Effects of the Action Alternative to Sensitive Plants***

  The effects would be the same as the No-Action Alternative. No change would be expected since no harvesting or road construction within at least 100 feet of Beaver Creek is planned. Mitigation measures used for noxious weeds would also mitigate the risk of establishing noxious weeds in the project area as the result of harvesting activities.

Cumulative Effects

- ***Cumulative Effects of the Action and No-Action Alternative to Sensitive Plants***

  Cumulative effects are expected to be similar to both the direct and indirect effects. Improved noxious weed management, as well as increased use of mitigation measures, should reduce the spread of noxious weeds into habitats where sensitive plants occur.

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Pfister, R., B. Kovalchik, S. Arno, and R. Presby. 1977. Forest Habitat Types of Montana. USDA Forest Service. General Technical Report INT-34. Intermountain Forest and Range Experimental Station. Ogden, UT.

ATTACHMENT II-B
WATER RESOURCES ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the hydrologic and fisheries resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were identified regarding water-quality, water-quantity, and fisheries resources. After reviewing the public and internal comments, DNRC developed the following issue statements regarding the potential effects of the proposed timber harvesting:

- Timber harvesting and road construction has the potential to increase water yield, which, in turn, may affect stream channel stability.
- Timber harvesting and road construction activities may increase sediment delivery into streams and affect water quality.
- Timber-harvesting activities may affect the fish-habitat parameters of large woody debris, channel complexity, stream shading, stream temperature, and fish passage at road crossing structures.

These issues can best be evaluated by analyzing the anticipated effects of sediment delivery and water yield on the water quality of streams in the project area.

The *ENVIRONMENTAL EFFECTS* sections disclose the anticipated direct, indirect, and cumulative effects to water resources in the analysis area from the proposed actions. Past, current, and future planned activities on all ownerships in each analysis area have been taken into account for the cumulative-effects analysis.

The primary concerns relating to aquatic resources in the analysis area are potential impacts to water quality from sources outside the channel as well as inside. In order to address these issues, the following parameters are analyzed by alternative:

- miles of new road construction and road improvements
- potential for sediment delivery to streams
- increases in the Equivalent Clearcut Acre (ECA) and annual water yield
- increases or decreases in fish-habitat parameters

ANALYSIS METHOD

Sediment Delivery

The methods applied to the project area to evaluate potential direct, indirect, and cumulative effects include a field review of potential sediment sources from haul routes. Stream crossings and roads were evaluated to determine existing sources of introduced sediment. Potential sediment delivery from harvest units will be evaluated from a risk assessment. This risk assessment will use the soil information provided in the *SOILS ANALYSIS* and the results from soil monitoring on past DNRC timber sales.

Water Yield

Annual water yield will be disclosed as a cumulative effect in the *EXISTING CONDITIONS* portion of this report because the existing condition is a result of all past harvesting and associated activities. Annual water yield refers to the gross volume of water in a watershed that is contributed to a stream or other surface water feature. In the *ENVIRONMENTAL EFFECTS* portion of this report, water-yield increases as a result of

this project will be disclosed as a direct effect. The cumulative water-yield increase as predicted to include each alternative will be disclosed as a cumulative effect.

The annual water-yield increase for watersheds in the project area was estimated using the ECA method as outlined in *Forest Hydrology, Part II (Haupt et al, 1976)*.

ECA is a function of total area roaded, harvested, or burned; percent of crown removed during harvesting or wildfire; and amount of vegetative recovery that has occurred in the harvested or burned areas. As live trees are removed, the water that would have evaporated and transpired either saturates the soil or is translated to runoff. This method also estimates the recovery of these increases as new trees revegetate the site and move toward preharvest water use.

In order to evaluate the potential effects of water-yield increases, a threshold of concern for each watershed was established per *ARM 36.11.423*. Thresholds were established based on evaluating the acceptable risk level, resources value, and watershed sensitivity. Increased annual water yields above the threshold of concern result in an increased risk of in-channel erosion and degradation of fisheries habitat.

Fish Habitat Parameters

Expected effects to fisheries habitat will be addressed qualitatively using the current condition as a baseline, disclosing the expected changes due to the alternatives proposed. The analysis method for woody debris recruitment will evaluate the potential reduction in available woody debris and shading due to timber-harvesting activities. Stream temperature will be addressed by evaluating the risk of stream temperature increases due to reduced shading from existing vegetation.

ANALYSIS AREA

Sediment Delivery

The analysis area for sediment delivery is limited to the harvest units and roads used for hauling. This includes upland sources of sediment that could result from this project. In addition, in-channel sources of sediment such as mass-wasting locations or excessive scour/deposition will be discussed for portions of Jim Creek and Beaver Creek.

Water Yield and Cumulative Effects

Two separate water-yield analysis areas will be included in this project: Beaver Creek and Jim Creek. This is selected as the appropriate scale of analysis due to the size of the project versus the watershed size and the potential for impacts. Expanding the water yield and cumulative-effects area would only result in reduced potential measurable impacts from water-yield increases.

Fisheries Habitat Parameters

The analysis area for fisheries habitat parameters is the proposed harvest units immediately adjacent to fish-bearing streams. This includes proposed harvest units near Beaver Creek, Jim Creek, or their tributaries. Fish passage will be addressed by reviewing the current status of passage potential and comparing it to the changes from each alternative.

WATER USES AND REGULATORY FRAMEWORK

WATER QUALITY STANDARDS

This portion of the Kootenai River Basin, including Fortine Creek and its tributaries (Jim and Beaver creeks), is classified as B-1 by the DEQ, as stated in *ARM 17.30.609*. The water-quality standards for protecting beneficial uses in B-1 classified watersheds are located in *ARM 17.30.623*. Water in B-1 classified waterways is suitable for drinking, culinary and food processing purposes after conventional treatment, bathing, swimming and recreation, growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers, and agricultural and industrial water supply. State water-quality regulations limit any increase in sediment above the naturally occurring concentration in water classified B-1. Naturally occurring means condition or materials present from runoff or percolation over which man has no control or from developed land where all reasonable land, soil, and water conservation practices have been applied (*ARM 17.30.602 [17]*). Reasonable land, soil, and water conservation practices include "methods, measures or practices that protect present and reasonably anticipated beneficial uses…" (*ARM 17.30.602 [21]*). The State of Montana adopted BMPs through its non-point source management plan as the principle means of meeting the *Water Quality Standards*.

WATER QUALITY LIMITED WATERBODIES

Neither Beaver Creek nor Jim Creek are listed as a water-quality-limited waterbody in the *2008 303(d)* list. However, Fortine Creek, which is the receiving waters for both streams, is listed *2008 303(d)* list for partial support of aquatic life, cold-water fishery, and primary contact recreation. The listed probable causes for not fully supporting these uses include sedimentation/siltation, flow alterations, algal growth, and water temperature. Forest roads and silvicultural activities are listed as probable sources. The *303(d)* list is compiled by DEQ as required by *Section 303(d)* of the *Federal Clean Water Act* and the *Environmental Protection Agency Water Quality Planning and Management Regulations (40 Code of Federal Regulations (CFR), Part 130)*. Under these laws, DEQ is required to identify waterbodies that do not fully meet water-quality standards, or where beneficial uses are threatened or impaired.

STREAMSIDE MANAGEMENT ZONE LAW

All rules and regulations pertaining to the SMZ Law will be followed. An SMZ width of 100 feet is required on Class I and II streams when the slope is greater than 35 percent. An SMZ width of 50 feet is required when the slope is less than 35 percent.

WATER RIGHTS AND BENEFICIAL USERS

Surface water rights exist within 3 miles downstream of the project area for irrigation, stock watering, and wildlife/waterfowl habitat.

FISHERIES—THREATENED, ENDANGERED AND SENSITIVE SPECIES

Westslope cutthroat trout are listed as a Class-A Montana Animal Species of Concern. A Class-A designation is defined as a species or subspecies that has limited numbers and/or habitats both in Montana and elsewhere in North America, and elimination from Montana would be a significant loss to the gene pool of the species or subspecies (*Montana Fish, Wildlife and Parks, MTNHP,* and *Montana Chapter American Fisheries Society Rankings*). DNRC

has also identified westslope cutthroat trout as a sensitive species (*ARM 36.11.436*).

EXISTING CONDITION

GENERAL DESCRIPTION

- ***Beaver Creek***

  The Beaver Creek watershed is approximately 3,010 acres and includes several unnamed, first-order tributaries. Precipitation ranges from 20 to 30 inches per year, mostly in the form of snow. Beaver Creek flows in a northwest-to-southwest direction to its confluence with Fortine Creek. Several wet meadows are present on the DNRC-managed parcel, and some of the tributaries derive from small seasonal springs. Elevations in this watershed range from 3,400 feet above sea level at its confluence with Fortine Creek to approximately 5,125 feet above sea level on the divide between Edna Creek and Beaver Creek. Ownership within the watershed is comprised of private land (5.4 percent), DNRC-managed lands (21 percent), and USFS-managed lands (73.6 percent).

  A data search of the Montana Fisheries Information System indicates that westslope cutthroat trout, eastern brook trout, and rainbow trout inhabit Beaver Creek. Fisheries data collection in Beaver Creek occurred in July 2008 with electrofishing in the main channel and tributaries for fish presence and species composition. No fish were found in the tributaries and 2 subadult westslope cutthroat trout were found in the main channel above the most upstream crossing on DNRC-managed lands. Due to high pH values and an expected stable, cold temperature regime, habitat in the main channel is marginal. Habitat in the tributaries for wintering, spawning, or rearing is marginal at best (*Bower 2009*).

- ***Jim Creek***

  The Jim Creek watershed is approximately 5,420 acres and includes several unnamed first- and second-order tributaries. Precipitation ranges from 22 to 34 inches per year, mostly in the form of snow. Jim Creek flows in a south-to-north direction to its confluence with Stewart Creek. Elevations in this watershed range from 3,520 feet above sea level at its confluence with Stewart Creek to approximately 5,485 feet above sea level on Sunday Mountain. Ownership within the watershed is comprised of private land (16.1 percent), DNRC-managed lands (20.8 percent), and USFS-managed lands (63.1 percent).

  A review of available fisheries information indicates that westslope cutthroat trout, eastern brook trout, and rainbow trout are present in Jim Creek. Electrofishing was conducted in 2008 to verify fish presence and species composition in Jim Creek. During the electrofishing, no fish were found downstream of the crossing on DNRC-managed lands; however, several westslope cutthroat trout were identified upstream of the crossing. Due to at least a partial barrier at the DNRC-managed crossing site, a pure-strain westslope cutthroat trout population is suspected and genetic samples were taken during summer of 2009. Data from the sampling is not available at this time; however, it was noted that a single eastern brook trout was found at that time. Eastern brook trout are known to displace westlope cutthroat trout, while rainbow trout may hybridize with the native species. Wintering and rearing habitat observed in

the stream were considered to be very good (*Bower 2009*).

SEDIMENT DELIVERY

- **Beaver Creek**

  During field review, no substantial sediment sources were identified on haul roads in the Beaver Creek watershed within and below the DNRC-managed parcel. The roads, generally restricted, are well-vegetated. This vegetation reduces erosion on the road surfaces and, when coupled with adequate road design, minimizes sediment delivery to streams.

  Sediment from in-channel sources is limited to a few channel constrictions and outcurves. This channel is relatively stable with no identifiedmass-wasting sites . The wetlands and sloughs in the lower reach of Beaver Creek on DNRC-managed lands provide storage for runoff and dampens peak flows, which serves to limit channel erosion. The low-gradient wetlands also store sediment.

- **Jim Creek**

  Sediment delivery from sources outside the channel, such as road crossings, is limited. Three crossings exist on Jim Creek above its confluence with Stewart Creek. Two of these crossings are located on USFS-managed lands, while the remaining crossing is located on DNRC-managed lands. As part of the Trego Project by the USFS KNF, one of the crossings on Jim Creek was replaced and the second had BMP improvements added. Because of this recent work, sediment delivery to Jim Creek is very limited, although the replaced crossing may have some minor delivery during rain events. This could be substantially reduced with a slash filter and grass seeding. The crossing on DNRC-managed land is well vegetated and shows no signs of sediment delivery from road surfaces.

  Two restored crossing sites on the DNRC-managed parcel were reviewed. Both former crossings were well vegetated and showed no signs of sediment delivery.

  In-channel sediment sources are common at outcurves and channel constrictions in the DNRC-managed parcel. This is generally a result of limited rock in the streambank. Rock provides resistance to erosion by acting as a natural armor. The stream flows in an incised channel that has downcut in several locations. Much of the sediment generated from the channel adjustments is stored behind large woody debris deposits and existing dams. This includes a location immediately above the crossing on DNRC-managed land. Sediment has been deposited in this location for nearly 20 years behind an abandoned beaver dam.

FISH HABITAT PARAMETERS

- **Large Woody Debris**

  Large woody debris recruitment to streams is important to maintain channel form and function and as a component of fish habitat. According to *ARM 36.11.425*, DNRC will establish a Riparian Management Zone (RMZ) *'…when forest management activities are proposed …on sites that are adjacent to fish bearing streams and lakes.'* One reason for the RMZs is to retain adequate levels of large woody debris recruitment to the stream channel. Site potential tree height is the method used to identify RMZ width according to *ARM 36.11.425 (5).* Past data collection for site potential tree height in Stillwater State Forest has resulted in site potential tree

heights up to 104 feet, including a site on Fortine Creek. No site potential tree height information was collected as part of this analysis. However, no harvesting is planned within 100 feet of any fish-bearing stream in the project area; therefore, a risk of adversely affecting large woody debris recruitment would not be expected.

- **Stream Temperature**

  No long-term temperature monitoring has occurred in any of the streams in the project area. Spot temperatures ranging from 7.1 to 9.3 degrees Celsius were recorded in Beaver Creek during July 2008. Due to the spring-dominated flow regime in Beaver Creek, temperatures are speculated to be relatively stable and may not reach sufficient levels needed for the successful incubation of embryos.

  Jim Creek had a spot temperature of 11.5 degrees Celsius during July 2008. This temperature coupled with no indication of an unusually cold or warm thermograph would be expected to provide favorable conditions for westslope cutthroat trout.

- **Fish Passage**

  Fish passage on the Beaver Creek parcel was reviewed by the DNRC fisheries biologist. Currently this crossing (known as Fish Passage Inventory Site #922) provides for fish passage to all life stages at all flows.

  Fish passage on the Jim Creek parcel was also reviewed by the DNRC fisheries biologist. This crossing (known as Fish Passage Inventory Site #924) has a perched outlet and a beaver dam near the inlet that limits passage to juvenile fish.

WATER YIELD AND CUMULATIVE EFFECTS

A harvest history was developed from USFS data, aerial photos, and section record cards to estimate the annual water-yield increases for the Beaver Creek watershed. Harvesting in the state parcel has occurred since the 1940s. Within the Beaver Creek watershed, consistent harvesting took place in the 1960s through the 1990s. Small salvage harvesting has taken place for several decades, as well as Christmas tree harvesting and firewood gathering. Using the ECA method described earlier, the existing annual water-yield increase for the Beaver Creek watershed is estimated at 8.8 percent.

A recent analysis (2007) of water yield was conducted by the Kootenai National Forest for the Trego Project. The peak-flow increase (generally higher than the annual water-yield increase) was estimated to be 12 percent over a fully forested condition.

After reviewing the beneficial uses, existing channel conditions, and existing watershed condition per *ARM 36.11.423*, the threshold of concern for the Beaver Creek and Jim Creek watersheds was set at 13.2 percent over a fully forested condition. These threshold values expect a low to moderate degree of risk of adverse impacts to beneficial uses due to water-yield increases as described in *ARM 36.11.423(f)(iv)*.

DESCRIPTION OF ALTERNATIVES

- ***No-Action Alternative***

  No timber harvesting or associated activities would occur under this alternative. Existing activities such as recreational use, individual Christmas tree harvesting, and firewood gathering would continue.

- ***Action Alternative***

  Eighteen units totaling approximately 554 acres would be managed with a precommercial thinning or commercial harvest under this alternative. Approximately 469 acres would be commercially harvested using conventional ground-based equipment, while the remaining 82 acres would be treated with a precommercial thin. In addition, approximately 0.3 miles of new system road and 0.28 miles of temporary road would be constructed, 0.14 miles of road would be obliterated, and 10.35 miles of road would be maintained or have minor drainage improvements installed as necessary to protect water quality. A portion of one harvest unit (approximately 20 acres) would be completed under winter conditions, which require frozen and/or snow-covered ground. The remainder of the units (531 acres) may be completed under summer or winter conditions.

  Existing activities such as recreational use, individual Christmas tree harvesting, and firewood gathering would continue.

ENVIRONMENTAL EFFECTS

DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative to Water Resources***

  Sediment Delivery

  Under this alternative, no timber harvesting or related activities would occur. The existing direct sediment-delivery sources would continue until repaired by another project or funding source. In-channel sources of sediment would continue to exist and erode as natural events dictate.

  Fish Habitat Parameters

  - ***Large Woody Debris Recruitment***

    No reduction in recruitable large woody debris would result from the implementation of this alternative.

  - ***Stream Temperature***

    No increases in stream temperature from a reduction in stream shading would be expected under this alternative.

  - ***Fish Passage***

    No changes to fish passage in the Beaver Creek or Jim Creek parcels would occur. While the Beaver Creek site currently passes all life forms at all flows, the Jim Creek site would continue to only pass adult fish. No barrier augmentation would be implemented, which may result in additional risk of hybridized westslope cutthroat trout.

  Water Yield

  No increase in water yield would be associated with this alternative.

- ***Direct and Indirect Effects of the Action Alternative to Water Resources***

  Sediment Delivery

  Past monitoring of DNRC timber harvests has shown erosion on approximately 6 percent of the sites monitored, although no water-quality impacts from the erosion were found (*DNRC 2004*). These sites were harvested during the summer period, and the erosion was attributed to inadequate skid-trail drainage. Monitoring of soil impacts from past DNRC timber sales have found that "winter logging resulted in minimal soil displacement. Displacement was limited to main skid trails that occupy less than

2% of the harvest units." (*DNRC 2004*). By minimizing displacement, less erosion would likely occur compared to other harvest methods with more extensive disturbance (*Clayton 1987* in *DNRC 2004*).

No harvesting would occur within the SMZ of any stream; additionally, no harvesting would occur within 100 feet of a fish-bearing stream. As per *ARM 36.11.304*, no equipment would be operated within the 50- or 100-foot SMZ.

During a review of BMP effectiveness, including the effectiveness of stream buffers, *Raskin et al* found that 95 percent of erosion features (disturbed soil) greater than 10 meters (approximately 33 feet) from the stream did not deliver sediment. His findings indicated that the main reasons stream buffers are effective include 1) keeping active erosion sites away from the stream, and 2) stream buffers may intercept and filter runoff from upland sites as long as the runoff is not concentrated in gullies or similar features (*Raskin et al 2006*).

The proposed road construction does not include new stream crossings, although some work on the Jim Creek crossing would be implemented to augment a barrier to fish passage in an effort to protect the potentially pure strain of the westslope cutthroat trout population. Some sediment would likely be released during the barrier augmentation; however, the sediment pulse would be short-lived and follow all rules associated with the required 124 Permit and 318-Authorization (short-term turbidity exemption). Effects of the short-term sediment pulse would likely provide discomfort to fish and potentially displace the fish for up to 1,000 feet downstream.

All new and temporary road construction would occur well away from streams on soils that are suitable for road construction (*Kuennen and Nielsen–Gerhardt, 1995*). Because revegetation may be difficult on the road fill, erosion may occur, but due to the distance from streams, sediment delivery and subsequent water-quality impacts would not likely occur.

Existing roads would have drainage improvements and BMP upgrades implemented under this alternative. Minor drainage improvements include reshaping drain dips, cleaning ditch-relief culvert catchbasins, as well as installing ditch-relief culverts. Other drainage improvements include stream-crossing upgrades, such as rock armor, to meet BMPs. Current maintenance activities would continue to provide drainage to area roads.

Because postharvest water-yield levels under this alternative would remain below the threshold where adverse impacts would be expected, only a low risk of increased in-channel sediment would result from this alternative. In-channel sources of sediment would be expected to continue to contribute sediment at the current rate because the water-yield increase would remain below the recommended threshold.

Because DNRC would incorporate BMPs into the project design as required by *ARM 36.11.422 (2)* and all laws pertaining to SMZs would be followed, a low risk of sediment delivery from timber-harvesting activities would result from the implementation of this alternative. Therefore, the risk of long-term adverse

direct or indirect effects to water quality or beneficial uses would be low.

Fish Habitat Parameters

- ***Large Woody Debris Recruitment***

  As described earlier, no harvesting would occur within 100 feet of fish-bearing streams. Because the existing recruitable large woody debris would not be removed as part of the sale, a very low potential of direct adverse impacts would result. However, postharvest windthrow may be increased, which could slightly increase the channel complexity (*Bower 2009*).

- ***Stream Temperature***

  Harvesting along fish-bearing streams would occur outside of 100-foot buffers. Because stream shading would not be reduced within the 100-foot buffer along fish-bearing streams and within the 50-foot buffer of all other streams, the risk of increasing stream temperatures due to timber harvesting would be very low.

- ***Fish Passage***

  No changes to fish passage in the Beaver Creek parcel would occur. The site currently passes all life forms at all flows.

  This crossing on Jim Creek (Site #924) would have the barrier augmented at the outlet to reduce the risk of genetic degradation in the potentially pure strain westslope cutthroat trout population in the upper reaches of Jim Creek.

Water Yield

If this alternative were selected, approximately 469 acres would be harvested using conventional ground-based methods and 82 acres would be precommercially thinned. Approximately 253 ECA would be generated in the Beaver Creek watershed from these activities and 111 ECA would be generated in the Jim Creek watershed. The annual water yield in Beaver Creek would increase by 3.3 percent; Jim Creek would experience an annual water-yield increase of approximately 0.8 percent.

CUMULATIVE EFFECTS

- ***Cumulative Effects of the No-Action Alternative to Water Resources***

Sediment Delivery

The potential for sediment contribution from the proposed haul route would still exist, as would the in-channel sediment sources described in *EXISTING CONDITION*. The existing direct sediment-delivery sources would continue until repaired by another project or funding source. In-channel sources of sediment would continue to exist and erode as natural events dictate.

Fish Habitat Parameters

- ***Large Woody Debris Recruitment***

  No reduction in recruitable large woody debris would result from the implementation of this alternative. Recruitable large woody debris would be retained at an adequate level to maintain stream form and function.

- ***Stream Temperature***

  No increases in stream temperature from a reduction in stream shading would be expected under this alternative because no harvesting would occur. Natural stream temperatures would be maintained with a low degree of risk.

- ***Fish Passage***

  No changes to fish passage in the Beaver Creek parcel would occur. The site currently passes all life forms at all flows.

  No barrier augmentation would be implemented, which may result in additional risk of hybridized westslope cutthroat trout.

Water Yield

No increase in water yield would be associated with this alternative. As vegetation continues toward preharvest conditions, annual water-yield increases would gradually reduce to preharvest levels.

Cumulative Effects Summary

Because no timber harvesting or associated activities would occur under this alternative, cumulative effects would be limited to the natural progression of the existing condition. Sediment sources would continue unless repaired under a separate project. Conditions would continue to support fish-habitat parameters and provide adequate levels of large woody debris and shade to maintain channel form and function and also support a natural range of water temperatures. Under this alternative, fisheries habitat quality would be maintained at its current level with a low degree of risk of change due to anthropogenic sources. A risk to the potentially pure-strain westslope cutthroat trout population would result because the barrier augmentation would not be implemented.

- ***Cumulative Effects of the Action Alternative to Water Resources***

Sediment Delivery

The proposed timber-harvesting and road construction would occur. A minor reduction in direct sediment delivery may occur due to minor drainage improvements. The short-term sediment increase during the fish-barrier augmentation would not be expected to have long-term impacts to fish populations or fish habitat other than to restrict fish passage as designed. A cumulative increase in sediment delivery as a result of timber harvesting would have a low risk of occurring because of BMP application and adequate stream buffers to filter potential displaced soil. In-channel sources of sediment would continue to exist and erode as natural events dictate with a low risk of affecting beneficial uses.

Fish Habitat Parameters

- ***Large Woody Debris Recruitment***

  Available large woody debris would not be diminished within 100 feet of fish-bearing channels; however, the timing of recruitment may be slightly increased due to changes in local wind patterns.

- ***Stream Temperature***

  Because of the amount of shade-producing vegetation that would be removed, a low risk of cumulative temperature increases above naturally occurring ranges would result from the implementation of this alternative.

- ***Fish Passage***

  No changes to fish passage in the Beaver Creek parcel would occur. The site currently passes all life forms at all flows.

  This crossing on Jim Creek (Site #924) would have the barrier augmented at the outlet to reduce the risk of genetic degradation in the potentially pure-strain westslope cutthroat trout population in the upper reaches of Jim Creek.

Water Yield

The estimated cumulative water-yield increase in the Beaver Creek watershed would be 12.1 percent if this alternative were selected. The direct water-yield increase for Jim Creek would be less than one percent and, therefore, would remain below the recommend threshold. Because the levels would remain below the threshold set in accordance with *ARM 36.11.425(g)*, a low degree of risk to water quality would result from the implementation of this alternative.

Cumulative Effects Summary

Because all timber-harvesting activities would follow BMPs as required by *ARM 36.11.422* and the direct and indirect effects would have a low risk of impacts, a low risk of additional adverse cumulative effects would be expected to occur under this alternative. This expectation includes the results of (1) a minor reduction in direct sediment delivery to streams from BMP upgrades such as slash filters; (2) a potentially slight increase in the rate of recruitable large woody debris in the RMZ along fish-bearing streams; and (3) an increase in modeled annual water-yield estimates. Furthermore, conditions would continue to support fish-habitat parameters and provide adequate levels of large woody debris and shade to maintain channel form and function and also support a natural range of water temperatures. Under this alternative, fisheries habitat quality would also be maintained at its current level, with a low degree of risk of change due to anthropogenic sources. The barrier augmentation project would reduce the risk of hybridization of the potentially pure-strain westslope cutthroat trout population in upper Jim Creek.

Because the annual water-yield increases would remain below the thresholds of concern and BMPs would be implemented during timber-harvesting and road-construction operations, the risk of adverse cumulative impacts to water quality and beneficial uses, including fisheries habitat, would be low.

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ATTACHMENT II-C
SOILS ANALYSIS

INTRODUCTION

This analysis is designed to disclose the existing condition of the soil resources and display the anticipated effects that may result from each alternative of this proposal. During the initial scoping, issues were identified internally and from the public regarding soil impacts. The following issue statements were expressed from comments regarding the effects of the proposed timber harvesting:

- Ground-based harvesting techniques can displace and compact soils, which can adversely affect the hydrologic function, structure, and long-term productivity of the impacted area.
- The reduced infiltration capacity of an impacted soil can result in overland flow and off-site erosion, typically localized to main skid trails and landing sites.
- The removal of both coarse and fine woody material off-site during timber-harvesting operations can reduce nutrient pools required for future forest stands and can affect the long-term productivity of the site.

ANALYSIS AREA

The project area for this proposal is approximately 1,480 acres. The project area contains 4 individual landtypes where timber harvesting, road construction/ reconstruction, or road obliteration are proposed. The analysis area for soil impacts will be the area within harvest units and where proposed road activities would take place. This analysis area will adequately allow for disclosure of existing conditions and direct, indirect, and cumulative impacts. This analysis also looks at cumulative effects for the entire project area.

ANALYSIS METHODS

Methods for disclosing impacts include using general soil descriptions and the management limitations for each landtype. *Landtype* refers to a unit of land with similar designated soil, vegetation, geology, topography, climate, and drainage. This analysis will qualitatively assess the risk of negative effects to soils from erosion, compaction, and displacement from each alternative, using insight from previously collected soils-monitoring data from over 70 DNRC postharvest monitoring projects.

Coarse woody debris will be evaluated by comparing preproject conditions with recommended levels. Mitigation measures will be refined using these data.

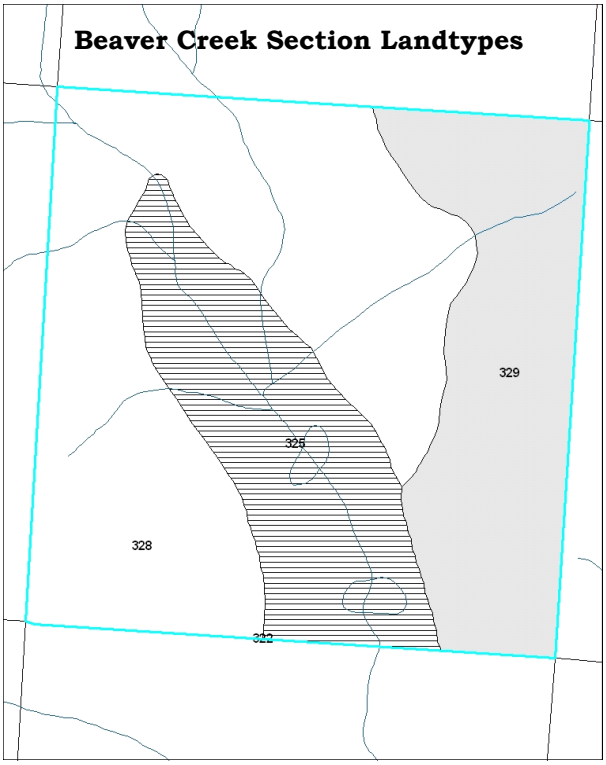
While the anticipated impacts from each alternative will disclose the direct/indirect effects, the cumulative impacts will be the result of previous and proposed activities.

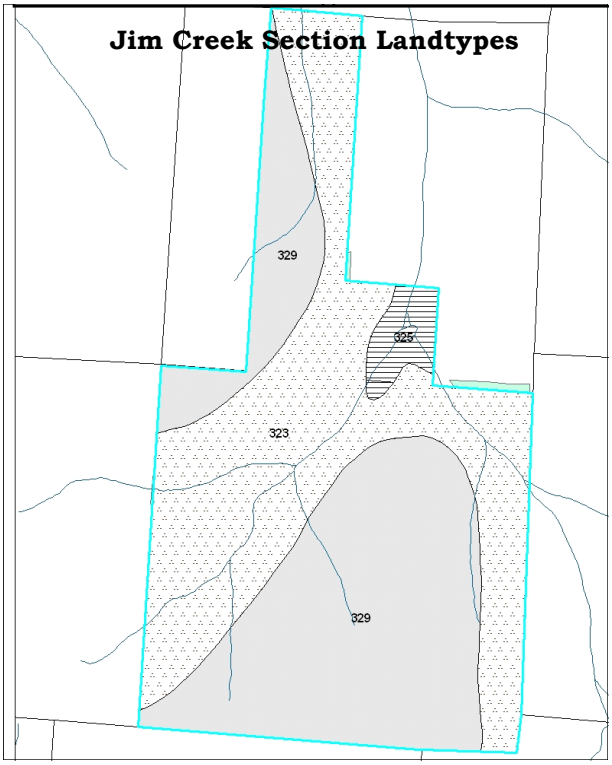
EXISTING CONDITIONS

GENERAL CONDITIONS

The *Soil Survey of Kootenai National Forest Area, Montana* (*Kuennen and Nielsen–Gerhardt, 1995*) combines landform and soil information with habitat types to inventory and map soils in the project area. Four landtypes were identified in the project area. *TABLE II-C-1 - PROJECT AREA LANDTYPE DESCRIPTIONS* provides a brief description of the landtypes within the project area, while *FIGURES II-C-1 – LANDTYPES IN THE PROJECT AREA* provides a visual depiction of the landtype locations.

FIGURE II-C-1—LANDTYPES IN THE PROJECT AREA





Kootenai National Forest and other ownerships within the forest boundaries, like much of northwest Montana, are dominated by bedrock consisting of metasedimentary rocks from the Proterozoic age. Rocks in this formation are generally comprised of argillites, quartzites, and siltites. Surface deposits of glacial till, outwash, and lacustrine sediments can be found throughout the area. Overlying these sediments is a layer of loess that has been influenced by volcanic ash deposited and redeposited from Mount Mazama approximately 6,700 to 6,800 years ago. This ash layer is more obvious in locations closer to Mount Mazama and is generally present on northerly aspects and above elevations of 4,500 feet on southerly elevations. Heavy vegetation protects the existing ash layer and minimizes erosion (*Martinson and Basko, 1998; Kuennen and Nielsen–Gerhardt, 1995).*

CUMULATIVE EFFECTS

DNRC strives to maintain soil productivity by limiting cumulative soil impacts to 15 percent or less of a harvest area, as noted in the SFLMP (*DNRC, 1996*). As a recommended goal, if existing detrimental soil effects exceed 15 percent of an area, proposed harvesting should minimize any additional impacts. Harvest proposals on areas with existing soil impacts in excess of 20 percent should avoid any additional impacts and include restoration treatments, as feasible, based on site-specific evaluation and plans. Past monitoring on DNRC timber sales from 1988 to 2007 has shown an average of 13.9-percent soil impacts across all parent materials. Stratifying the results by texture similar to the majority of the proposed harvesting shows an average of approximately 13.1 percent of the harvest areas impacted by displacement, erosion, or

severe compaction. Typically, when winter harvesting is implemented on these areas, the impacts are much less than summer operations due to frozen soils being more difficult to compact or displace. However, winter harvesting on the stratified results was higher (15.9 percent) than summer harvesting results. This can be attributed to dozer piling during unsuitable conditions. The average impacts from winter harvesting are considerably less (9.8 percent) when the outlier is removed from the equation.

Cumulative effects from past and current uses on the proposed harvest units are limited, although evidence of selective or salvage action is present in some of the proposed harvest areas. In addition, stands adjacent to proposed harvest areas have been entered in the past. During field reconnaissance, it was noted that impacts in these areas are limited to skid trails and roads. Pace transects indicate skid-trail spacing during past harvesting operations in the Jim Creek parcel resulted in 10.6 percent of the area trafficked by skid trails. While many of these skid trails are still discernable, vegetation similar to the surrounding vegetation is generally present and growing. Through the freeze-thaw cycles and root mass penetration of the soil, impacts from past entries are substantially reduced. These data indicate the cumulative level of impacts in the Jim Creek parcel is below the 15-percent goal. Ocular review during field reconnaissance on the Beaver Creek section suggests impacts similar to those found on the Jim Creek parcels.

Past harvesting operations in the project area includes large-scale (greater than 200 Mbf) harvests that started in 1946, 1952, 1974, and 1985. Other forest-product removals, including firewood gathering, fencepost cutting, Christmas tree harvesting, and small permits for commercial sawlogs, have occurred throughout the last 70 years.

TABLE II-C-1—LANDTYPES IN THE PROJECT AREA

LANDTYPE	NAME	SOIL AND VEGETATION DESCRIPTIONS	MANAGEMENT CONSIDERATIONS			
			K FACTOR**/ EROSION POTENTIAL	TIMBER	ROADS	COMMENTS
323	Moraines 15- to 35-percent slopes	This landtype is comprised of silt loam soils formed over calcareous, compact glacial till. Vegetation is typically a dry, mixed forest of Douglas-fir, western larch, and lodgepole pine over an understory of pinegrass and low shrubs.	K=0.37 Erosion potential is severe on skid trails where soils have been exposed. Sediment delivery efficiency is low.	323	Moraines 15– to 35-percent slopes	Trees may be susceptible to windthrow due to limited root penetration through the compact till lower soil. Rotting wood is important source of nitrogen.
325	Floodplains and alluvial fans 5- to 25-percent slopes	This landtype is found on stream bottoms along small mountain streams. Soils are generally silty on the surface and overly calcareous glacial till. Lime content can be very high. Vegetation is made up of mixed-conifers species that grow in most moist environments of the Northwest. The under story is dominated by forbs and low shrubs.	K=0.32 Erosion potential is moderate to severe. Sediment delivery efficiency is high. Fine sediment from these soils has a high potential for damaging spawning habitat.	325	Floodplains and alluvial fans 5-to 25-percent slopes	Although the floodplains are seldom flooded, stream channels may change frequently. The water table may be near the surface during spring runoff and snowmelt. Trees may be susceptible to windthrow due to limited root penetration.
328	Glaciated mountain slopes 15- to 35-percent slopes	Soils of this landtype are volcanic ash-influenced loess over calcareous glacial till. Vegetation found is a mixed forest of subalpine fir, western larch, lodgepole pine, Douglas-fir, and Engelmann spruce over a shrub- and forbs-dominated understory.	K=0.28 Erosion potential is moderate. Sediment delivery efficiency is moderate.	328	Glaciated mountain slopes 15– to 35-percent slopes.	Trees may be susceptible to windthrow due to limited root penetration. Volcanic ash-influenced loess is susceptible to compaction if season of operation is not managed.
329	Moraines, glacial till deposits. 15- to 35-percent slopes	This landtype is characterized by up to 14 inches of volcanic ash-influenced loess overlying a calcareous glacial till. Vegetation found is a mixed forest of subalpine fir, Engelmann spruce, Douglas-fir, western larch, and lodgepole pine over a low shrub- and forbs-dominated understory.	K=0.28 Erosion potential is moderate. Sediment delivery efficiency is low	329	Moraines, glacial till deposits. 15– to 35-percent slopes	Trees may be susceptible to windthrow due to limited root penetration. Volcanic ash-influenced loess is susceptible to compaction if season of operation is not managed.

*Erosion Potential is based on slope and soil erosion factor K**. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50 to 70 percent of the surface has been exposed by logging, grazing, mining, or other kinds of disturbances. The hazard is described as slight (low), moderate, severe, or very severe. A rating of slight indicates that erosion is unlikely under ordinary climatic conditions; moderate indicates that some erosion is likely and that erosion-control measures may be needed; severe indicates that erosion is very likely and that erosion-control measures, including revegetation of bare areas, are advised; and very severe indicates that significant erosion is expected, loss of soil productivity and off-site damage are likely, and erosion-control measures are costly and generally impractical. (NRCS, 1996)*

***Erosion Factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water. (NRCS, 1996*

DESCRIPTION OF ALTERNATIVES

- ***No-Action Alternative***

  No timber harvesting or associated activities would occur under this alternative.

- ***Action Alternative***

  Eighteen units totaling approximately 551 acres would be managed with precommercial thinning or commercial harvesting under this alternative. Approximately 469 acres would be commercially harvested using conventional ground-based equipment, while the remaining 82 acres would be treated with a precommercial thin. In addition, approximately 0.3 mile of new system road and 0.28 mile of temporary road would be constructed, 0.14 mile of road would be obliterated, and 10.35 miles of road would be maintained or have minor drainage improvements installed as necessary to protect water quality. A portion of one harvest unit (approximately 20 acres) would be completed under winter conditions, which require frozen and/or snow-covered conditions. The remainder of the units (531 acres) may be completed under summer or winter conditions.

ENVIRONMENTAL EFFECTS

DIRECT AND INDIRECT EFFECTS

- ***Direct and Indirect Effects of the No-Action Alternative on Soils***

  No timber harvesting or associated activities would occur under this alternative. Skid trails from past harvesting would continue to recover from compaction as freeze-thaw cycles continue and vegetation root mass increases.

- ***Direct and Indirect Effects of the Action Alternative on Soils***

  To provide an adequate analysis of potential impacts to soils, a brief description of implementation requirements is necessary. *ARM 36.11.422 (2)* and *(2)(a)* state that appropriate BMPs shall be determined during project design and incorporated into implementation. To ensure that the incorporated BMPs are implemented, the specific requirements would be incorporated into the *State of Montana Timber Sale Contract*. As part of this alternative design, the following BMPs are considered appropriate and, therefore, would be implemented during harvesting operations:

  1) Limit equipment operations to periods when soils are relatively dry (less than 20-percent moisture), frozen, or snow-covered to minimize soil compaction and rutting and maintain drainage features. Check soil moisture conditions prior to equipment start-up.
  2) On ground-based units, the logger and sale administrator will agree to a general skidding plan prior to equipment operations. Skid-trail planning will identify which main trails to use and how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) will not be used and may be closed with additional drainage installed where needed or grass seeded to stabilize the site and control erosion.
  3) Limit tractor skidding to slopes of less than 40 percent unless the operation can be completed without causing

excessive erosion. Steeper areas may require other methods such as adverse skidding to a ridge or winchline skidding from more moderate slopes of less than 40 percent.

4) Limit skid trails to 20 percent or less of the harvest unit acreage. Provide for drainage in skid trails and roads concurrently with operations.

5) Slash disposal - Limit the combination of disturbance and scarification to 30 to 40 percent of the harvest units. No dozer piling is allowed on slopes greater than 35 percent; no excavator piling is allowed on slopes over 40 percent unless the operation can be completed without causing excessive erosion. Consider lopping and scattering or jackpot burning on the steeper slopes. Accept disturbance incurred during skidding operations to provide adequate scarification for regeneration.

6) Retain 10 to 15 tons of large woody debris and a majority of all fine litter feasible following harvesting operations. On units where whole-tree harvesting is used, implement one of the following mitigations for nutrient cycling: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

Considering data from the *DNRC SOIL MONITORING REPORT (DNRC, 2004)*, the implementation of Forestry BMPs has resulted in less risk of detrimental soil impacts from erosion, displacement, and severe compaction. While the report noted that the impacts were more likely on the fine-textured soils and steep slopes, reduced soil productivity due to compaction and displacement may occur on coarser parent materials similar to those found in the state parcels. Also, the greatest impacts were noted where harvesting implementation departed from BMPs, such as limiting ground-based skidding to slopes of 40 percent or less or operating only on dry, frozen, or snow-covered soils.

Comparing the soil type map, field reconnaissance notes, and topographic map features with the proposed harvest unit map indicates that ground-based skidding would occur on slopes of up to 40 percent under this alternative. The extent of impacts expected would likely be similar to those reported by *Collins (DNRC, 2004)*, or approximately 13.1 percent of the harvest area for summer harvesting. Potential impacts to soils from the winter harvest areas would be expected to be less than 10 percent of the area because site preparation work would be limited to periods of dry (less than 18-percent soil moisture). No measureable soil impacts would be expected from the precommercial thinning because equipment (other than chainsaws) would not be used. *TABLE II-C-2 – EXPECTED ACRES OF IMPACT TO SOIL FROM COMPACTION AND DISPLACEMENT* summarizes the expected impacts to soils within harvest units.

In addition to the potential impacts from harvesting, approximately 1.8 acres would be impacted by new roads.

TABLE II-C--2 - EXPECTED ACRES OF IMPACT TO SOIL FROM COMPACTION AND DISPLACEMENT

HARVEST METHOD AND SEASON	NO-ACTION ALTERNATIVE	ACTION ALTERNATIVE
Ground-based - summer harvest (449 acres with impacts up to 13.1 percent of the harvest area)	0	58.8 acres
Ground-based - winter harvest (20 acres with impacts up to 9.8-percent of the harvest area)		2 acres
Precommercial thinning (82 acres - nonmechanized)	0	0 acres
Total area of impacts	0	60.8 acres
Total treated acres	0	551 acres
Percent of area impacted	0	11.0 percent

Approximately 0.85 of these acres (0.28 mile of temporary road) would be reclaimed or seeded with grass and littered with slash and brush. The remaining acres would essentially be removed from timber production. Road construction would likely result in more erosion than native topography; however, BMP implementation would minimize the risk of erosion. Because no stream crossings are proposed, the risk of delivering soil to watercourses would be very low.

As vegetation begins to establish on the impacted areas and freeze-thaw cycles occur, the area of reduced productivity would decrease.

CUMULATIVE EFFECTS

- ***Cumulative Effects of the Action Alternative to Soils***

  No additional cumulative effects would occur.

- ***Cumulative Effects of the Action Alternative to Soils***

  Cumulative effects would be controlled by limiting the area of adverse soil impacts to less than 15 percent of the harvest units (as recommended by the *SFLMP*) through implementation of BMPs, skid trail planning on tractor units, and limiting operations to dry or frozen conditions. Future harvesting opportunities would likely use the same road system, skid trails, and landing sites to reduce additional cumulative impacts. Large woody debris would be retained for nutrient cycling for long-term soil productivity.

  On a project-area analysis, DNRC estimates that 60.8 acres of land may be impacted by skid trails and landings as part of this alternative; an additional 1.8

acres of ground would be removed from production or have reduced productivity due to road construction.

By designing the proposed harvesting operations with soil-moisture restrictions, season of use, and method of harvesting, the risk of unacceptable long-term impacts to soil productivity from compaction and displacement would be low. Because the existing impact is below the goals recommended by the SFLMP and the action alternative would be expected to result in impacts below the recommended level, cumulative effects would likely remain below the 15 percent target.

REFERENCES

DNRC, 2004. DNRC Compiled Soils Monitoring Report on Timber Harvest Projects. Missoula, MT

DNRC, 1996. SFLMP. Montana Department of Natural Resources and Conservation. Missoula, MT.

Kuennen, Louis J. and Marci L. Nielsen-Gerhardt. 1995. Soil Survey of Kootenai National Forest Area, Montana. USDA Forest Service, Kootenai National Forest, Libby, MT

ATTACHMENT II-D
WILDLIFE ANALYSIS

INTRODUCTION

This analysis is designed to identify and document existing conditions for wildlife resources found in the vicinity of this project and display the anticipated effects that may result from each alternative of this proposal. During initial scoping, both internal and external, several comments were received regarding the effects of the proposed timber harvesting that led to the development of the following list of issues:

- Concern was expressed that timber harvesting could reduce forested cover, which could reduce the amount of mature forested habitats available to those species that rely upon these habitats and/or decrease the ability of some wildlife species to move through the landscape.
- Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent upon these resources.
- Concern was expressed that timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.
- Concern was expressed that timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitat components, leading to a decreased ability for the area to support Canada lynx.
- Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites.
- Concern was expressed that timber harvesting and associated activities could alter gray wolf prey availability.
- Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.
- Concern was expressed that timber harvesting and associated activities could alter habitat attributes needed by flammulated owls for nesting.
- Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers from active nests.
- Concern was expressed that timber harvesting and associated activities could reduce thermal cover on big game winter ranges, which could reduce the carrying capacity of the winter range.

The following sections disclose the anticipated direct, indirect, and cumulative effects to these wildlife resources in the analysis area from the proposed actions. Past and current activities on all ownerships

in each analysis area, as well as planned future agency actions, have been taken into account for the cumulative-effects analysis.

ANALYSIS AREAS

The discussions of existing conditions and environmental effects will focus on 2 different scales. The first will be the 'project area', which consists of Sections 16, 36, and portions of 25 in T33N, R26W (approximately 1,484 acres), where the proposed logging activities would occur. The second scale, or the 'cumulative-effects analysis area', relates to the surrounding landscape for assessing cumulative effects to wildlife and their habitats. For several resources analyzed below, where no specific biological parameters were indicated (such as the home range area for a particular species), the 21 sections surrounding the project area and the project area (21 square miles, total) are delineated for the analysis of cumulative effects. These 21 parcels represent a land area of approximately 13,440 acres. In this smaller cumulative-effects analysis area, the ownership pattern is a mosaic of USFS-managed lands (63 percent), DNRC-managed lands (16 percent), and other private landowners (21 percent). A second cumulative-effects analysis area of 79,995 acres was also identified and is used for wide-ranging mammals and their habitats, such as grizzly bears, Canada lynx, gray wolves, and fishers. In this larger cumulative-effects analysis area, the ownership pattern is a mosaic of USFS-managed lands (81 percent), DNRC-managed lands (3 percent), other private landowners (16 percent), and a minor component of industrial private timberland (less than 1 percent).

ANALYSIS METHODS

DNRC attempts to promote biodiversity by taking a 'coarse-filter approach', which favors an appropriate mix of stand structures and compositions on state lands (*ARM 36.11.404*). Appropriate stand structures are based on ecological characteristics (e.g., land type, habitat type, disturbance regime, unique characteristics). A coarse-filter approach assumes that if landscape patterns and processes are maintained similar to those with which the species evolved, the full complement of species would persist and biodiversity would be maintained. This coarse-filter approach supports diverse wildlife populations by managing for a variety of forest structures and compositions that approximate historic conditions across the landscape. DNRC cannot assure that the coarse-filter approach will adequately address the full range of biodiversity; therefore, DNRC also employs a 'fine-filter' approach for threatened, endangered, and sensitive species (*ARM 36.11.406*). The fine-filter approach focuses on a single species' habitat requirements.

For each species or habitat issue, existing conditions of wildlife habitats are described and compared to the anticipated effects of the No-Action Alternative and the proposed Action Alternative to determine the foreseeable impacts to potentially affected wildlife species and their habitats.

To assess the existing condition of the proposed project area and surrounding landscape, a variety of techniques were used. Field visits, scientific literature, SLI data, aerial photographs, MNHP data, and consultations with other professionals provided information for the following discussion and effects analysis. Specialized

methodologies are discussed under the species in which they occur. Species were dismissed from further analysis if habitat did not exist in the project area or would not be modified by the Action Alternative.

COARSE-FILTER ANALYSIS

Of the 108 mammal species found in Montana, 71 are suspected or known to occur in Lincoln County (*Foresman 2001*). The majority of terrestrial vertebrates that were present at the time of European settlement likely still occur in the vicinity of the proposed project area. Eight amphibian and eight reptile species have also been documented in Lincoln County (*Maxell et al. 2003*) and at least 118 species of birds have been documented in the vicinity in the last 10 years (*Lenard et al. 2003*). Terrestrial species that rely on special habitat elements, such as whitebark pine (*Pinus albicaulis*), western white pine (*Pinus monticola*), or burned areas, may not be present or occur in lower abundance due to the decline of these elements across the landscape. Over time, due to fire suppression, tree densities have increased and shade-tolerant species, such as Douglas-fir and grand fir have become more prevalent than they were historically. These departures probably benefit wildlife species that rely on shade-tolerant tree species and/ or closed-canopy habitats, while negatively affecting species that rely on shade-intolerant tree species and/or open habitats.

MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY

Issue: Concern was expressed that timber harvesting could reduce forested cover that could reduce the amount of mature forested habitats available to those species that rely on these habitats and/or decrease the ability of some wildlife species to move through the landscape, which could alter their ability to use the area.

Introduction

A variety of wildlife species rely on mature to old stands for some or all life requirements. A partial list of these species includes pileated woodpeckers (*Dryocopus pileatus)*, American marten (*Martes americana*), brown creepers (*Certhia americana)*, and winter wrens (*Troglodytes troglodytes*). Wildlife species that require connectivity of forest habitat types between patches or those species that are dependent upon interior forest conditions can be sensitive to the amount and spatial configuration of appropriate habitats. Some species are adapted to thrive near patch edges, while others are adversely affected by the presence of edge or the other animals that prosper in edge habitats. Connectivity of forested habitats facilitates movements of those species that avoid nonforested areas and other openings; connectivity under historical fire regimes likely remained relatively high in types with long fire intervals as fire differentially burned various habitats across the landscape.

Analysis Area

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the 21 surrounding sections and the project area (approximately 13,440 acres). Habitats and wildlife found on these lands would be those most likely to be influenced by cumulative effects associated with nearby activities and habitat alteration on project-area lands. This scale of analysis was also selected because it is large enough to support a diversity of species that require connected forested habitats in the geographic vicinity of the project area.

Analysis Methods

Mature forested habitats and landscape connectivity were assessed using field evaluations, aerial-photograph interpretation, and GIS analysis. Factors considered in the analysis include the level of harvesting, the amount of densely forested habitats, and connectivity.

Existing Environment

The project area currently contains approximately 1,306 acres of mature stands (100-plus years in age) of Douglas-fir, western larch, and mixed-conifer stands that have a 40-percent or greater canopy coverage. These stands are interspersed with a variety of Douglas-fir, western larch, and mixed-conifer stands of varying ages and stocking densities. Approximately 20 acres in the project area currently meet *Green et al. (1992)* standards for old-growth classification and are at least 180 years old. Connectivity in the project area has been compromised with past timber harvesting and other human development on other land ownerships.

The network of open roads through the cumulative-effects analysis area, coupled with timber management on roughly 2,068 acres in the recent past, has reduced some of the landscape-level connectivity. However, across the cumulative-effects analysis area, landscape connectivity has largely been retained and considerable forested, interior habitats exist. Considerable amounts (approximately 11,312 acres) of mature Douglas-fir, western larch, and mixed-conifer habitats that have a reasonably closed canopy exist across the cumulative-effects analysis area.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity***

  Forest conditions would continue to age and move toward denser stands of shade-tolerant tree species with high canopy cover. Largely, no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated. No changes in wildlife use would be expected; wildlife favoring dense stands of shade-tolerant tree species would benefit, while those requiring conditions likely found under natural disturbance regimes would continue to be underrepresented. Habitat for forested interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would likely improve with this alternative; however, western larch, a preferred snag species, could decline in abundance over time. Thus, no direct or indirect effects to mature forested habitats and connectivity would be expected that could affect wildlife in the project area since 1) no changes to existing stands would occur, 2) no appreciable changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated, and 3) no changes to wildlife use would be expected.

- ***Direct and Indirect Effects of the Action Alternative on Mature Forested Habitats and Connectivity***

  Approximately 578 acres of Douglas-fir, western larch, and mixed-conifer stands would be harvested, including roughly 492 acres of mature stands with a closed canopy. Most of these acres of mature, forested habitats proposed for treatments would receive a regeneration-type

treatment, which would reduce habitat for those species relying on mature, closed-canopied forested habitats. Overall, the resultant changes in stand age and density would reduce habitats for species associated with older stands, such as American marten and pileated woodpeckers, which benefited from the increasing stand ages and densities caused by modern fire suppression or lack of forest management. Minor reductions in landscape connectivity would be anticipated with the proposed harvesting; however, landscape connectivity has been compromised in the vicinity with the diversity of ownerships, past harvesting, human development, and roads. Some habitat connectivity will be retained through heavier cover retention in stream-management zones and fisher buffers in riparian areas. In general, under this alternative, habitat conditions would improve for species adapted to the more-open forest conditions, while reducing habitat quality for species that prefer dense, mature forest conditions. Thus, minor adverse direct and indirect effects to mature forested habitats and connectivity would be expected that could adversely affect some species of wildlife in the project area since 1) harvesting would reverse succession in several stands, reducing stand age and the amount of forested cover, 2) minor changes to landscape connectivity would occur, and 3) some changes to wildlife use would be expected.

- ***Cumulative Effects of the No-Action Alternative on Mature Forested Habitats and Connectivity***

  Habitats in the cumulative-effects analysis area are a mosaic of habitat types and age classes. Past harvesting has reduced the amount of mature, forested habitats; however, the general trend in the cumulative-effects analysis area is conversion to mature forests. This alternative would continue to contribute to the mature forested stands in the cumulative-effects analysis area. Losses of individuals and pockets of trees due to natural events such as high winds would not likely alter the overall age or landscape connectivity. Under this alternative, continued use of the analysis area by species favoring dense stands of shade-tolerant tree species and those species requiring larger areas of mature forests would be expected. Habitat for forested-interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would likely persist. Thus, no cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since 1) no changes to existing stands would occur, 2) no near-term changes to forest age, the distribution of dense forested cover, or landscape connectivity would be anticipated, and 3) no changes to wildlife use would be expected.

- ***Cumulative Effects of the Action Alternative on Mature Forested Habitats and Connectivity***

  Despite the general trend of conversion to mature forested habitats in the cumulative-effects analysis area, past harvesting has reduced the amount of mature, forested habitats (approximately 15 percent). Reductions in mature, forested habitats associated with this alternative would be additive to losses associated with past harvesting activities. Across the analysis area, extensive forested habitats would still exist and landscape connectivity would persist. Habitats for forested interior species and old-stand-associated species, such as American marten, northern goshawk, and pileated woodpecker, would be expected to be reduced; however, continued use of the analysis area would be expected. Thus, minor adverse cumulative effects to mature forested habitats and connectivity would be expected that could affect wildlife in the cumulative-effects analysis area since 1) harvesting would remove mature stands, further reducing the amount of forested cover in the cumulative-effects analysis area, 2) no appreciable changes to landscape connectivity would occur, and 3) some changes to wildlife use would be expected.

SNAGS AND COARSE WOODY DEBRIS

Issue: Concern was expressed that timber harvesting could reduce snags and coarse woody debris densities, leading to a decline in the quality of habitat for those wildlife species that are dependent upon these resources.

Introduction

Snags and coarse woody debris are important components of the forested ecosystems. The 5 primary functions of deadwood in the forested ecosystems are to 1) increase structural diversity, 2) alter the canopy microenvironment, 3) promote biological diversity, 4) provide important habitat for wildlife, and 5) act as a storehouse for nutrient and organic matter recycling agents (*Parks and Shaw 1996*). Snags and defective trees (partially dead, spiked top, broken top) are used by a wide variety of wildlife species for nesting, denning, roosting, feeding, and cover. Snags and defective trees may be the most valuable individual component of Northern Rocky Mountain forests for wildlife species (*Hejl and Woods 1991*). The quantity, quality, and distribution of snags affect the presence and population size of many of these wildlife species.

Snags provide foraging sites for insectivorous species and offer opportunities for primary cavity-nesting species to excavate nests. The cavities created by primary excavators (i.e. woodpeckers) also provide habitat for secondary cavity users, including other birds and small and mid-sized mammals. Snags and defective trees can also provide nesting sites for secondary cavity users where cavities are formed by broken tops and fallen limbs. Primary risk factors for snags include loss to legal and

illegal firewood cutting, prescribed burning, removal for wood fiber, purposeful felling during timber-harvesting operations for human safety, and incidental loss during logging due to equipment operation and yarding activities.

The tree species, diameter, height, decay stage, and densities of snags determine the snag-habitat value for wildlife species. Larger, taller snags tend to provide nesting sites, while shorter snags and stumps tend to provide feeding sites (*Bull et al. 1997*). Many species that use the smaller-diameter snags will also use large snags; however, the opposite is not true. Typically, older-aged stands will have greater numbers of large snags. Snags in early stages of decay are often used more for feeding substrates, while mid-level decay provides opportunities for cavity excavation (*Schepps et al. 1999*). Some species of trees decay at slower rates than others, thereby providing habitat for longer periods of time. For example, western larch, western white pine, and ponderosa pine are harder woods that decay less rapidly than Douglas-fir, subalpine fir, or Engelmann spruce trees. Finally, snag densities are another important aspect of habitat value for cavity-nesting birds, as many of these species tend to nest in areas where snag densities are high, using one snag for nesting, but having others nearby for foraging or roosting opportunities.

Coarse woody debris provides structural diversity and promotes biological diversity by providing habitat for many wildlife species. Many small mammals require coarse woody debris to survive. In turn, these species distribute fungi that are beneficial for seedling establishment and tree growth (*Graham et al. 1994*). Additionally, coarse woody debris can provide feeding substrates for species such as pileated woodpeckers and black bears, as logs will often host high densities of insects (*Aney and McClelland 1985*). Forest carnivores such as pine marten and lynx rely on coarse woody debris to provide resting and denning habitat (*Patton and Escano 1990, Squires et al. 2008*).

The quality and distribution of coarse woody debris can affect habitat quality for wildlife species that rely on coarse woody debris to meet various life requisites. Longer lengths of large-diameter downed wood typically provide higher-quality habitat for wildlife than do smaller and/or shorter pieces. Single scattered logs can provide lookout and travel sites, while log piles provide denning and resting habitat. Under natural conditions, logs tend to occur in patches or clumps, often where a blowdown event has occurred, with scattered lone logs occasionally distributed in between.

Analysis Areas

Direct and indirect effects were analyzed on the project area. Cumulative effects were analyzed on the 21 surrounding sections and the project area (approximately 13,440 acres). Wildlife species associated with snags and coarse woody debris found on these lands would be those most likely to be influenced by cumulative effects associated with nearby activities and proposed habitat alteration on the project area. This scale of analysis would be large enough to support a diversity of species that use coarse woody debris resources, from birds to small mammals and meso-carnivores.

Analysis Methods

Snags and coarse woody debris were assessed both visually and through vegetation plots collected during site visits, as well as by reviewing past DNRC harvesting information. Factors considered in the analysis include the level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting.

Existing Environment

During field visits, approximately 8 variably spaced snags per acre and 5 to 10 tons of coarse woody debris per acre were observed in the project area. Approximately 7 snags per acre in the 8 to 16-inch diameter at breast height (dbh) class, approximately 0.6 snags per acres in the 17- to 20-inch dbh class, and approximately 0.6 snag per acre in the greater than 21-inch dbh class are in the project area. The 5 to 10 tons of coarse woody debris per acre also exhibit a large range of decay classes from sound to fully decayed.

In the cumulative-effects analysis area, past harvesting has limited snag and coarse woody debris densities in some of the area (approximately 15 percent). Snags and coarse woody debris are often collected for firewood, especially near open roads. Firewood gathering in areas adjacent to open roads may have significantly reduced densities of snags and coarse woody debris.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Snags and Coarse Woody Debris***

  No direct changes in snag or coarse woody debris densities would be expected. Existing snags would continue to provide wildlife habitats, and new snags would be recruited as trees die. However, in the long-term, densities of shade-intolerant trees and resulting snags could decline as these species are replaced by increasing numbers of shade-tolerant species. Shade-intolerant species tend to provide important habitats, such as nesting structures and foraging habitats, for cavity-nesting birds. Coarse woody debris would persist without other disturbances influencing its distribution and quality. Continued decay and decline in existing snags and trees would continue to contribute to the coarse woody debris in the project area. Thus, negligible direct and indirect effects would be anticipated to snags and coarse woody debris that would be expected to affect habitat quality for wildlife species requiring these habitat attributes since 1) no harvesting would occur that would alter present or future snag or coarse woody debris concentrations and 2) no changes to human access for firewood gathering would occur.

- ***Direct and Indirect Effects of the Action Alternative on Snags and Coarse Woody Debris***

  Present and future snags and coarse woody debris would be reduced due to timber harvesting on 578 acres in the project area. Prescriptions call for the retention of a minimum of 2 large snags per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), and 10 to 15 tons of coarse woody debris per acre in the proposed units where it exists. However, some snags and/or recruit trees could be lost due to safety

and operational concerns, but replacements would be identified to ensure ample amounts are present after logging. Future snag quality in the harvested units would be enhanced with proposed silvicultural prescriptions that should lead to the reestablishment of shade-intolerant species that tend to provide important habitats, such as long-lasting nesting structures and foraging habitats, for cavity-nesting birds. Given the amounts, range of variability in sizes, and decay classes of snags and coarse woody debris present in the project area, prescriptions aiming to maintain a variety of these resources would benefit the suite of species that rely on these habitat components. Additionally, conditions in the stand posttreatment will reduce the risk of the loss of these snag-recruitment trees due to bug infestations or fire. While the proposed harvest may reduce the density of snags and their recruits in the near future, the sustainability of snags in the area will increase. Thus, minor adverse direct and indirect effects to snags and coarse woody debris that would affect wildlife species requiring these habitat attributes for 30 to 100 years would be anticipated since 1) harvesting would reduce snags, snag-recruitment trees, and coarse woody debris and 2) no changes to human access for firewood gathering would occur.

- ***Cumulative Effects of the No-Action Alternative on Snags and Coarse Woody Debris***

  Snags and coarse woody debris would not be altered in the project area. The species composition of future snags could be altered with changing species composition in the stands due to advances in succession. Snags have been retained during some of the past harvesting in the cumulative-effects analysis area. Portions of the cumulative-effects analysis area would continue to have minor amounts of snags and coarse woody debris. Wildlife species in the cumulative-effects analysis area that rely on snags and coarse woody debris would be expected to persist. Thus, no cumulative effects to snags and the quality of coarse woody debris would be anticipated since 1) no further harvesting would occur, 2) the change in the numbers of snags would be negligible, and 3) the level of firewood gathering would not change.

- ***Cumulative Effects of the Action Alternative on Snags and Coarse Woody Debris***

  Some snags and coarse woody debris could be removed from the project area, while others may be recruited. Posttreatment conditions in the stand would reduce the risk of losing snag-recruitment trees to fire. While the proposed harvest may reduce the density of snags and their recruits in the near future, the sustainability of snags in the area will increase. The losses of snags and coarse woody debris associated with this alternative would be additive to the losses associated with past and ongoing harvesting on surrounding lands. However, the project requirements to retain a minimum of 2 large snags per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), 2 large snag recruits per acre (greater than 21 inches dbh where they exist, otherwise the next largest size class), and 10 to 15 tons of coarse woody debris per acre would mitigate additional cumulative effects associated with this project.

Wildlife species that rely on snags and coarse woody debris in the cumulative-effects analysis area would be expected to persist at similar levels, albeit slightly lower numbers on proposed harvest sites following treatment. Thus, minor adverse effects to the quality of habitat for wildlife requiring snags and coarse woody debris would be anticipated that would affect these species in the cumulative-effects analysis area for 30 to100 years since 1) a slight (approximately 4 percent), but cumulative, amount of the cumulative-effects analysis area would be harvested, reducing snags and snag-recruit trees while increasing sustainability and maintaining or increasing coarse woody debris levels, 2) no change in access for the general public and associated firewood gathering would be anticipated, and 3) representation of shade-intolerant species that could become snags in the long-term would be slightly increased.

FINE-FILTER ANALYSIS

In the fine-filter analysis, individual species of concern are evaluated. These species include wildlife species listed as threatened or endangered under the Endangered Species Act of 1973, species listed as sensitive by DNRC, and species managed as big game by the DFWP. *TABLE II-D-1 – STATUS OF SPECIES CONSIDERED IN THE FINE FILTER ANALYSIS FOR THIS PROPOSED PROJECT* summarizes how each species considered was included in the following analysis or removed from further analysis because suitable habitat does not occur in the project area or proposed activities would not affect their required habitat components.

TABLE II-D-1 –STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT

SPECIES	DETERMINATION - BASIS
THREATENED AND ENDANGERED SPECIES	
Grizzly bear	***Included*** – The project area is in 'occupied habitat' as mapped by *T. Wittinger, Unpub. Interagency Map (2002)*. Thus, grizzly bears may potentially occur in the project area.
Canada lynx	***Included*** – Potential lynx habitats occur in the project area.
Gray wolf	***Included*** – The project area contains portions of the Murphy Lake Wolf Pack annual home range and contains approximately 1,480 acres of big game winter range.
SENSITIVE SPECIES	
Bald eagle	The project area is approximately 9 air miles from the nearest known bald eagle nest site. Little or no use of the project area would be anticipated. Thus, no direct, indirect, or cumulative effects to bald eagles would be expected to occur as a result of either alternative.

SPECIES	DETERMINATION - BASIS
SENSITIVE SPECIES (continued)	
Black-backed woodpecker	No recently (less than 5 years) burned areas are in the project area. Thus, no direct, indirect, or cumulative effects to black-backed woodpeckers would be expected to occur as a result of either alternative.
Coeur d'alene salamander	No moist talus or streamside talus habitat occurs in the project area. Thus, no direct, indirect, or cumulative effects to Coeur d'Alene salamanders would be expected to occur as a result of either alternative.
Columbian sharp-tailed grouse	No suitable grassland communities occur in the project area. Thus, no direct, indirect, or cumulative effects to Columbian sharp-tailed grouse would be expected to occur as a result of either alternative.
Common loon	The small perennial lakes in and near the project area are not known to support loons. The project area is approximately 7 air miles from the nearest known nest and, as a result, would not be affected by either alternative. Thus, no direct, indirect, or cumulative effects to common loons would be expected to occur as a result of either alternative.
Fisher	***Included*** – Potential fisher habitats occur in the project area.
Flammulated owl	***Included*** – Potential flammulated owl habitats occur in the project area.
Harlequin duck	No suitable high-gradient streams occur in the project area. Thus, no direct, indirect, or cumulative effects to harlequin ducks would be expected to occur as a result of either alternative.
Northern bog lemming	No suitable sphagnum bogs or fens occur in the project area. Northern bog lemmings are known to occupy bogs in the cumulative-effects analysis area, although occupied bogs are approximately 2 and 5 air miles from the project area. As a result, these populations would not likely be affected by either alternative. Thus, no direct, indirect, or cumulative effects to northern bog lemmings would be expected to occur as a result of either alternative.
Peregrine falcon	No suitable cliffs/rock outcrops occur in the project area. Thus, no direct, indirect, or cumulative effects to peregrine falcons would be anticipated as a result of either alternative.
Pileated	***Included*** – Potential pileated woodpecker habitats occur in the project

SPECIES	DETERMINATION - BASIS
SENSITIVE SPECIES (Continued)	
Townsend's big-eared bat	No caves or mine tunnels occur in the project area. Townsend's big-eared bats actively roost in the cumulative-effects area approximately 2 air miles from the project area. As a result, this colony would not be expected to be affected by either alternative. Thus, no direct, indirect, or cumulative effects to Townsend's big-eared bats would be anticipated as a result of either alternative.
BIG GAME SPECIES	
Big game winter range	***Included*** – Approximately 1,480 acres of the project area was identified as white-tailed deer and moose winter ranges, as well as approximately 840 acres of elk winter range.
Elk security habitat	The project area does not include habitats that are greater than 0.5 mile from an open road or are in patches of dense cover greater than 250 acres in size and, therefore, does not include elk security habitat characteristics (*Hillis et al.*).

THREATENED AND ENDANGERED SPECIES

- ***GRIZZLY BEAR***

  Issue: Concern was expressed that timber harvesting and associated activities could alter cover, increase access, and reduce secure areas, which could adversely affect grizzly bears by displacing grizzly bears from important habitats and/or increasing risk to bears of human-caused mortality.

  Introduction

  Grizzly bears are native generalist omnivores that use a diversity of habitats found in western Montana and are currently listed as 'threatened' under the *Endangered Species Act*. Preferred grizzly bear habitats are meadows, riparian zones, avalanche chutes, subalpine forests, and big game winter ranges, all of which provide seasonal food sources. Primary habitat components in the project area include meadows, riparian areas, and big game winter ranges. Primary threats to grizzly bears are related to human-bear conflicts, habituation to unnatural foods near high-risk areas, and long-term habitat loss associated with human development (*Mace and Waller 1997*). Forest-management activities may affect grizzly bears by altering cover and/or by increasing access to humans into secure areas by creating roads (*Mace et al. 1997*). These actions could lead to the displacement of grizzly bears from preferred areas and/or result in an increased risk of human-caused mortality by bringing humans and bears closer together and/or making bears more detectable, which can increase their risk of being shot illegally. Displacing bears from preferred areas may increase their energetic costs, which may, in turn, lower their ability to survive and/or reproduce successfully.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on a 79,995-acre area around the project area; this combined area was selected to approximate the home range size of a female grizzly bear.

Analysis Methods

Field evaluations, aerial photograph interpretation, and GIS analysis were the basis for this analysis. Open-road densities in the cumulative-effects analysis area were calculated using a simple linear calculation method. Factors considered in this cumulative-effects analysis area include level of human disturbance, availability of timbered stands for hiding cover, and miles of open roads.

Existing Environment

The proposed project is located approximately 8 miles west of the Stryker Subunit of the Northern Continental Divide Ecosystem (NCDE) Grizzly Bear Recovery Zone (*USFWS 1993*) and is included in 'occupied habitat', as mapped by grizzly bear researchers and managers to address increased sightings and encounters of grizzly bears in habitats outside of recovery zones (*T. Wittinger, Unpub. Interagency Map*). Therefore, grizzly bears could appear in the proposed project area at any time.

Managing human access is a major factor in management for grizzly bear habitats. Presently, open-road densities in the project area (approximately 0.74 mile per square mile; simple linear calculations) are below the threshold of 1 mile per square mile established through DNRC's administrative rules (*ARM 36.11.433*).

Although grizzly bears could use the project area at any time, extensive use is unlikely given the moderate level of human disturbance and the relatively unrestricted vehicular access in portions of the project area.

The majority of the cumulative-effects analysis area receives low levels of human use, while areas closer to Fortine Creek and private lands experience increased human use and associated disturbance. Habitats across the cumulative-effects analysis area are a combination of age classes ranging from recently harvested stands to mature stands. Some agricultural areas and areas of human disturbance occur in the areas closer to Fortine Creek on private ownerships. Portions of the cumulative-effects analysis area have been recently harvested, while others have seen limited or no harvesting in the past. Human disturbance levels and the level of forest harvesting are both closely tied to road access. Motorized access on open roads is relatively high in the cumulative-effects analysis area, with an estimated 1.95 miles per square mile (simple linear calculation); however, portions of the cumulative-effects analysis area (approximately 6 percent) on private lands are very accessible, while other portions on USFS-managed lands are less accessible (approximately 87 percent).

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Grizzly Bears***

  No direct effects to grizzly bears would be expected. No changes to the level of disturbance to grizzly bears would be anticipated. Foraging opportunities might decline due to the lack of

diversity in habitat, such as forest edge and younger age-class stands. No changes in open-road densities or hiding cover would be anticipated. Thus, since no changes in available habitats or level of human disturbance would be anticipated, no direct or indirect effects to grizzly bears would be anticipated.

- ***Direct and Indirect Effects of the Action Alternative on Grizzly Bears***

  Should bears occur in the area, this alternative might affect grizzly bears directly through increased road traffic, noise, and human activity, and indirectly by altering the amount of hiding cover and forage resources. Activities in grizzly bear habitats reduce grizzly bear security, possibly resulting in increased stress and/or energy expenditure to endure the disturbance or to move from the area. These disturbances would only be present during harvesting operations. Portions of some units could be harvested from along open roads where disturbance from the open road has already reduced habitat quality. The temporary opening of currently closed roads would occur for no more than 4 consecutive seasons to minimize disturbance to grizzly bear habitats. Construction and use of approximately 0.3 mile of new road would contribute to the temporarily elevated open-road densities, increase the potential for disturbance to grizzly bears, and facilitate increased nonmotorized use of the project area. Meanwhile, closing roughly 0.26 mile of open road would reduce long-term open-road densities and the potential for disturbance to grizzly bears. Overall, the proposed activities would occur in areas where low levels of grizzly bear use would be anticipated and would occur during a limited time frame, leading to negligible disturbance and displacement of grizzly bears.

  Hiding cover, defined as vegetation that will hide 90 percent of a grizzly bear at a distance of 200 feet, would be reduced on much of the 578 acres in the proposed harvest units in the short-term; however, cover would improve with time as shrub and tree regeneration proceed. Hiding cover is especially important along open roads and in areas that receive human disturbance. Hiding cover in the form of brush, shrubs, and submerchantable trees would be retained along open roads where available and feasible, and hiding cover throughout the harvested units would be expected to regenerate in 5 to 10 years. Closed roads that would be opened with this alternative and newly constructed roads would be again closed in a manner to discourage motorized access after the proposed harvesting. Collectively, negligible changes in open-road and total-road densities would be anticipated. Thus, minor adverse direct or indirect effects to grizzly bears in the local area would be expected in the short-term since 1) negligible disturbance and displacement would be anticipated, 2) hiding cover would be lost in the short-term, but would be expected to recovery fairly rapidly, and 3) short-term increases in open-road densities would be anticipated, but long-term

open-road densities would be slightly reduced.

- ***Cumulative Effects of the No-Action Alternative on Grizzly Bears***

  Motorized access to the area and open-road densities would remain unchanged. Existing forested stands throughout the cumulative-effects analysis area would be expected to persist into the future; regenerating stands are either presently providing hiding cover and forage resources or would be expected to do so in the near future. Human development and associated disturbance in the portions of the cumulative-effects analysis area limits the likelihood of grizzly bear use in those areas; present levels of human disturbance would be expected to continue into the future. Thus, no further adverse cumulative effects would be expected to affect grizzly bears in the cumulative-effects analysis area since 1) no changes in human disturbance levels would be expected, 2) no changes to open-road densities would occur, and 3) no further losses of hiding cover would occur.

- ***Cumulative Effects of the Action Alternative on Grizzly Bears***

  The increased use of road systems during the implementation of the proposed project would temporarily increase human disturbance to grizzly bears in a portion of the cumulative-effects analysis area, should bears occur there. Proposed activities would occur in the portion of the cumulative-effects analysis area already experiencing moderate levels of human disturbances largely associated with open roads and private ownerships and would be away from the more remote portions of the cumulative-effects analysis area that are more likely to be used by grizzly bears. Collectively, minor short-term (2 to 4years) increases in human disturbance would be anticipated in the 'occupied habitat' area. Continued use of the cumulative-effects analysis area and Stillwater State Forest by grizzly bears would be anticipated. Reductions in hiding cover would be additive to the reductions from past timber harvesting, as well as more permanent land-cover changes, in the cumulative-effects analysis area; however, appreciable amounts of the cumulative-effects analysis area are currently providing hiding cover. Early successional stages of vegetation occurring in harvest units could provide foraging opportunities that do not exist in some mature stands. Minor reductions in long-term open-road densities would be expected; a fairly extensive road system would persist and continue to facilitate human access in the cumulative-effects analysis area. Thus, minor adverse cumulative effects to grizzly bears would be expected in the short-term (2 to 4years) and minimal adverse cumulative effects would be expected over the long-term since 1) minor increases in human disturbance levels would be expected in the cumulative-effects analysis area, 2) hiding cover would be lost in the short-term on a small portion of the cumulative-effects analysis area (approximately 4 percent), but would be expected to recovery fairly rapidly, and 3) negligible changes in long-term open-road densities would occur.

- **Issue:** Concern was expressed that timber harvesting and associated activities could remove canopy closure or alter stand conditions, which could result in the reduction or modification of habitat components, leading to a decreased ability for the area to support lynx.

Introduction

Canada lynx are listed as 'threatened' under the Endangered Species Act. Canada lynx are associated with subalpine fir forests, generally between 4,000 and 7,000 feet in elevation in western Montana (*87657654321`-=6*-/*-/--+1 et al. 2000*). The proposed project area ranges from approximately 3,680 to 4,720 feet in elevation and is dominated by Douglas-fir, western larch, and mixed conifers. Lynx habitat in western Montana consists primarily of stands that provide habitat for snowshoe hares, either dense young coniferous stands or dense mature forested stands. Mature subalpine fir stands with abundant coarse woody debris also provide structure important for denning and cover for kittens and dense cover that is used for travel and security. These conditions are found in a variety of habitat types, particularly in the subalpine fir series (*et al. 1977*). Historically, high intensity, stand-replacing fires of long fire intervals (150 to 300 years) in continuous dense forests of lodgepole pine, subalpine fir, and Engelmann spruce created extensive even-aged patches of regenerating forest intermixed with old stands that maintained a mosaic of snowshoe hare and lynx habitats.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted in the project area. Cumulative effects were analyzed on the 79,995-acre cumulative-effects analysis area described above. This scale of analysis is sufficient to include the home range of several lynx (*10Reedier77417410*-+ et al. 2000*).

Analysis Methods

To assess lynx habitat, DNRC SLI data were used to map specific habitat classes used by lynx. Lynx habitat (*ARM 36.11.403(40)*) was assigned to a stand if the SLI data indicated habitat types (*Pfizer+ et al. 1977*) that are consistent with those reportedly used by lynx (*Reedier+ et al. 2000*). Other parameters (stand age, canopy cover, and amount of coarse woody debris) were used in modeling the availability of the following 5 specific element of lynx habitat::

- denning,
- young foraging,
- mature foraging,
- forested travel/other habitat, and
- temporary non-lynx habitats.

Denning habitat provides important vegetative and woody structure needed to provide denning sites and security for juvenile lynx; however, denning habitat is not considered limiting for lynx in most forested landscapes in western Montana (*USFS Northern Rockies Lynx Amendment ROD 2007*). Foraging habitat is important for the survival of both adult and juvenile lynx. 'Forested travel/other habitat' is a general habitat category that provides for secondary prey items and contains modest levels of forest structure usable by lynx. Temporary non-lynx habitat consists of no

forest and open forested stands that are not expected to be used by lynx until adequate horizontal cover reestablishes. Factors considered in the analysis include landscape connectivity and the amount of DNRC-managed lands in the cumulative-effects analysis area in denning, foraging, and unsuitable habitats.

Existing Environment

Approximately 636 acres of lynx habitat (*TABLE II-D-2 – LYNX HABITATS*) occur in the 1,484-acre project area. Much of this habitat was identified as forested travel/ other habitats, with lesser amounts of mature foraging and temporary non-lynx habitats.

Canada lynx have been documented near (approximately 7 miles) the cumulative-effects analysis area. DNRC-managed habitats make up a small portion (approximately 3 percent) of the cumulative-effects analysis area and are dominated by forested travel/other habitats with lesser amounts of mature foraging and temporary non-lynx habitats (*TABLE II-D-2 – LYNX HABITATS*). The lack of fire, including the effects of fire suppression, has led to the development and maintenance of mature foraging and forested travel/other habitats on DNRC-managed lands. *Administrative Rules of Montana (ARM 36.11.435 (8)(a) & (b)(i))* require that a minimum of 5 acres and 10 percent of the lynx habitats on DNRC-managed lands be in denning and foraging habitats, respectively. Currently, no denning habitats were identified on DNRC-managed lands in the cumulative-effects analysis area and, therefore, the analysis area is not able to meet the denning habitat requirements presently; sufficient foraging habitats were identified to exceed the minimum threshold for foraging habitat requirements (*TABLE II-D-2 – LYNX HABITATS*).

Interpretations of aerial photographs of lands in the cumulative-effects analysis area that are not under DNRC management show a portion of habitats (approximately 15 percent) to be

TABLE II-D-2 – LYNX HABITATS. *Existing acres and proportions of lynx habitat elements on DNRC-managed lands in the project area and cumulative-effects analysis area.*

LYNX HABITAT ELEMENT	PROJECT AREA		CUMULATIVE EFFECTS ANALYSIS AREA	
	ACRES	PERCENT OF LYNX HABITATS	ACRES	PERCENT OF LYNX HABITATS
Denning	0	0	0	0
Mature foraging	99	16	99	16
Forested travel/other	440	71	440	71
Young foraging	0	0	0	0
Temporary nonhabitat	79	13	79	13
Grand total - lynx habitats	618	100	618	100
Total Acres	1,480		2,648	

dominated by temporary non-lynx-type habitats. The distribution of the various lynx habitat elements in the remaining portions of the cumulative-effects analysis area is the result, primarily, of past timber harvesting and the lack of recent wildfire activity. Connectivity at the cumulative-effects analysis level has been compromised by past harvesting and road construction on nearby USFS and private lands.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Canada Lynx***

  In the short-term, no changes in lynx habitat elements would be expected in the project area. Forested travel/other habitats in the project area would be expected to remain at similar levels or move into mature foraging or denning habitats in the future as shade-tolerant trees develop in the understory and coarse woody debris accumulates through time due to natural events. Mature foraging habitats would also be expected to remain at similar levels, increase, or move into denning habitat in the future as shade-tolerant trees develop in the understory and coarse woody debris accumulates. Temporary non-lynx habitats would be expected to remain at similar levels or potentially proceed to young foraging or forested travel/other habitats in the future depending on natural events. Therefore, in the short-term, no effects to lynx would be expected. In the longer-term, without disturbance, mature foraging and denning habitats may increase. Landscape connectivity would not be altered. Thus, minor beneficial indirect effects to lynx habitats would be expected to occur in the project area for 10 to 20 years since 1) denning habitat would not be altered, 2) sufficient mature foraging habitat would exist, 3) most lynx habitats would be in a usable state for lynx, and 4) landscape connectivity would not be altered.

- ***Direct and Indirect Effects of the Action Alternative on Canada Lynx***

  Approximately 177 acres of lynx habitats would be harvested with this alternative (*TABLE II-D-3 - CHANGES IN LYNX HABITATS*). In units proposed to receive regeneration-type and precommercial-thin prescriptions, canopy cover and horizontal cover would be removed. These prescriptions would convert available lynx habitat elements into the forested travel/other habitat class. Of these acres, the majority of the lynx habitats are forested travel/other habitats, with lesser amounts of mature foraging and temporary non-lynx habitats; after the proposed harvesting, these habitats would either move into forested travel/other or remain as temporary non-lynx habitat. In the proposed units, 10 to 15 tons of coarse woody debris per acre would be retained to provide some horizontal cover and security structure for lynx. In the short-term (approximately 2 years), lynx would likely avoid proposed harvest units that would be converted to forested travel/other habitats due to disturbance by timber harvesting. Overall forest connectivity would be reduced; however, current landscape connectivity in the area has been compromised through past harvesting

TABLE II-D-3 – CHANGES IN LYNX HABITATS. *Acreage changes in lynx habitat elements following implementation of the alternatives considered.*

CHANGES TO LYNX HABITATS	ALTERNATIVES	
	A	B
Denning habitat converted to forested travel/other	0	0
Mature foraging habitat converted to forested travel/other	0	48
Forested travel/other habitat treated, but remaining as forested travel/other	0	117
Temporary non-lynx habitat treated, but remaining as temporary non-lynx	0	12
Total increase in forested travel/other	0	165
Total lynx habitat affected	0	177

activities. Collectively, minor adverse direct and indirect effects to lynx habitats would be expected to affect Canada lynx in the project area for about 20 years following successful regeneration and forest ingrowth into harvest units since 1) denning habitats would not be altered, 2) sufficient mature foraging habitats would exist, 3) moderate amounts (approximately 13 percent) of lynx habitats would be in the temporary non-lynx habitat category, meaning most of the lynx habitats would be in a usable state for lynx, and 4) some further reduction in landscape connectivity would be anticipated.

- ***Cumulative Effects of the No-Action Alternative on Canada Lynx***

  No appreciable change in lynx habitats would occur under this alternative (*TABLE II-D-4 –CHANGES IN LYNX HABITATS IN THE CUMULATIVE-EFFECTS ANALYSIS AREA),* except the continued maturation of stands. Some modifications of lynx habitats could be possible with management that may occur on industrial timberlands and other private lands. Across all ownerships, continued stand maturation, in the absence of other disturbances, would move temporary non-lynx habitat towards young foraging habitat or forested travel/other habitat. No further changes in landscape connectivity would be anticipated due to DNRC activities at this time. Thus, minor beneficial cumulative effects to lynx habitats would be expected to affect Canada lynx in the cumulative-effects analysis area for 20 to 40 years since 1) denning habitats would not be altered, 2) sufficient mature foraging habitats would exist, 3) young foraging habitats would continue to provide habitat for snowshoe hares outside of DNRC-managed land, 4) longer-term availability of young foraging habitats would likely decline without disturbance, 5) temporary non-lynx habitats would continue to mature and

TABLE II-D-4 – CHANGES IN LYNX HABITATS IN THE CUMULATIVE-EFFECTS ANALYSIS AREA. *Acres of lynx habitats after each alternative and proportion each suitable habitat represents out of all suitable lynx habitats on DNRC-managed lands in the cumulative-effects analysis area.*

LYNX HABITAT		CUMULATIVE EFFECTS ANALYSIS AREA	
		NO-ACTION ALTERNATIVE	ACTION ALTERNATIVE
Denning	Acres posttreatment Percent of lynx habitats	0 0%	0 0%
Foraging	Acres posttreatment Percent of lynx habitats	99 16%	51 8%
Forested travel	Acres posttreatment Percent of lynx habitats	440 71%	488 79%
Temporary non-lynx habitats	Acres posttreatment Percent of lynx habitats	79 13%	79 13%
Total lynx habitats	Acres posttreatment	618	618
Total analysis area		2,648	2,648

move into habitats suitable for lynx use, and 6) landscape connectivity would persist.

- ***Cumulative Effects of the Action Alternative on Canada Lynx***

  In the cumulative-effects analysis area, lynx habitats would continue to persist (*TABLE II-D-4 - CHANGES IN LYNX HABITATS IN THE CUMULATIVE-EFFECTS ANALYSIS AREA*). Reductions in mature foraging in the proposed units would not be expected to appreciably alter lynx use of the cumulative-effects analysis area. These reductions and the subsequent increase in forested travel/other habitats would be additive to existing forested travel/ other habitats that exist in the cumulative-effects analysis area. Following harvesting, sufficient foraging habitats would be retained (*TABLE II-D-4 - CHANGES IN LYNX HABITATS IN THE CUMULATIVE-EFFECTS ANALYSIS AREA*) to satisfy DNRC's commitment (*ARM 36.11.435*) of retaining 10-percent mature foraging or young foraging habitats in the cumulative-effects analysis area. No changes will be made to denning habitats. Additionally, some modifications of lynx habitats could be possible with any management that may occur on other ownerships in the cumulative-effects analysis area. Adjacent USFS lands adhere to the Northern Rockies Lynx Amendment, which places rigid restrictions on reductions in forested lands. Across all ownerships, continued stand maturation would move habitats towards forested travel/other, mature foraging, and denning habitats and away from the young foraging stage,

which would decrease habitat quality for snowshoe hares, thereby possibly reducing the availability of prey for lynx in the long-term. Landscape connectivity would be further reduced with the proposed activities (see *WILDLIFE - LANDSCAPE CONNECTIVITY*). Thus, minor adverse cumulative effects to lynx habitats would be expected to affect Canada lynx in the cumulative-effects analysis area for about 20 years since 1) denning habitats would not be affected, 2) sufficient mature foraging habitats would exist, 3) young foraging habitats would continue to develop for the next 20 to 50 years across the cumulative-effects analysis area, and 4) some reductions in landscape connectivity may occur.

- ***GRAY WOLF***

Issue: Concern was expressed that timber harvesting and associated activities could displace gray wolves from important habitats, particularly denning and rendezvous sites.

Issue: Concern was expressed that timber harvesting and associated activities could alter grey wolf prey availability.

Introduction

The U.S. Fish and Wildlife Service (USFWS) recently delisted the gray wolf from the federal list of endangered species on March 28, 2008; however, a preliminary injunction upheld on July 18, 2008 led to the relisting of wolves in Montana as 'endangered'. On January 14, 2009, Deputy Secretary of the Interior Lynn Scarlett again announced the removal of the Montana and Idaho portions of the northern Rocky Mountain population of gray wolves from protection under the Endangered Species Act. On March 6, 2009, Secretary of the Interior Ken Salazar affirmed the decision by the USFWS to remove gray wolves from the list of threatened and endangered species in Montana. The final delisting rules were published by USFWS a second time on April 2, 2009, and became effective May 4, 2009. On June 2, 2009, 13 groups filed a lawsuit to have wolves placed back on the endangered species list, and additional lawsuits by other groups are pending. Given the lack of predictability of their near-term status, gray wolves will be considered as endangered in this analysis.

The *Northern Rocky Mountain Wolf Recovery Plan (USFWS 1987)* identified the key components of wolf habitat as 1) a sufficient, year-round prey base of ungulates (big game) and alternate prey; 2) suitable and somewhat secluded denning and rendezvous sites; and 3) sufficient space with minimal exposure to humans.

Wolves are wide-ranging opportunistic carnivores that frequently take vulnerable prey (including young individuals, older individuals, and individuals in poor condition). In general, wolf densities are positively correlated to prey densities (*Oakleaf et al. 2006, Fuller et al. 1992*). Wolves prey primarily on white-tailed deer, and, to a lesser extent, elk and moose in northwest Montana (*Kunkel et al. 1999*). However, some studies have shown that wolves may prey on elk more frequently during certain portions of the year (particularly winter) or in areas where elk numbers are higher (*Arjo et al. 2002, Kunkel et al. 2004, Garrott et al. 2006*). Thus, reductions in big game populations and/or

winter range productivity could indirectly be detrimental to wolf populations.

Wolves typically den during late April in areas with gentle terrain near a water source (valley bottoms), close to meadows or other openings, and near big game wintering areas. When the pups are 8 to 10 weeks old, wolves leave the den site and start leaving their pups at rendezvous sites while hunting. These sites are used throughout the summer and into the fall. Disturbance at den or rendezvous sites could result in avoidance of these areas by the adults or force the adults to move the pups to a less adequate site. In both situations, the risk of pup mortality increases. No known den or rendezvous sites are known in the project area; however, landscape features frequently associated with these sites occur in the cumulative-effects analysis area. The Murphy Lake Wolf Pack has been in the vicinity for at least the last 2 years and has been a breeding pair counted toward the recovery goals. The home range for this pack is variable, but has included portions of the project area for the last 2 years (*USFWS et al. 2008*).

Thus, wolves may be using the project area or nearby vicinity for hunting, breeding, and other life requirements.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted in the 1,484-acre project area. Cumulative effects were analyzed on the 79,995-acre cumulative-effects analysis area described above. This area includes the majority of the annual home range for the Murphy Lake Wolf Pack and would be large enough to support this pack.

Analysis Methods

Since changes in winter range could have a sizable effect on the availability of prey for wolves, portions of this analysis tier to the *BIG GAME WINTER RANGE* section, below. Disturbance at den and rendezvous sites is important during certain portions of the year, and timing of the proposed activities in relation to these sites is also important. Direct and indirect, as well as cumulative effects, were analyzed using field evaluations, aerial-photograph interpretation, and a GIS analysis of habitat components. Factors considered in the analysis include the amount of winter range modified and level of human disturbance in relation to any known wolf dens or rendezvous sites.

Existing Environment

Approximately 1,484 acres of white-tailed deer and 207 acres of elk winter range exist in the project area. There is no current knowledge of any den or rendezvous sites in the project area (*K. Laudon, DFWP, personal communication, May 4, 2009*). An extensive network of restricted roads, as well as a few open roads, exists in the project area.

In the larger cumulative-effects analysis area, white-tailed deer and elk winter ranges are abundant (approximately 38,418 and 47,779 acres, respectively). An additional 2,716 acres of mule deer winter range is located in the cumulative-effects analysis area. Numerous landscape features commonly associated with denning and rendezvous sites, including meadows and other openings near water and in gentle terrain, occur in the cumulative-effects analysis area. Wolves from the Murphy Lake Wolf Pack have

utilized the cumulative-effects analysis area in the past and would be expected to continue into the future. Past harvesting on all ownerships in the cumulative-effects analysis areas have altered big game and wolf habitats. Harvesting has reduced the amount of mature forest in the cumulative-effects analysis area (approximately 15 percent), in turn reducing the amount of thermal cover and snow intercept available to big game. Additionally, timber harvesting has resulted in an extensive road network in the cumulative-effects analysis area, which has increased human access and the potential for wolf-human interaction. Roadways and human dwellings in the cumulative-effects analysis area pose additional risks for wolves. Grazing leases are also present on neighboring USFS parcels in the cumulative-effects analysis area. Active grazing may pose a threat to wolves using the area due to the heightened potential for associated conflicts.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Gray Wolves***

  Disturbance to wolves would not increase. No changes in big game habitat, including no changes to forested cover on white-tailed deer or elk winter ranges would be expected during the short-term; therefore, no changes in wolf prey availability would be anticipated. No changes in the ability for wolves to use the project area would be expected. Thus, no direct and indirect effects would be expected to affect gray wolves since 1) no changes in human disturbance levels would occur and 2) no changes to big game winter range would occur.

- ***Direct and Indirect Effects of the Action Alternative on Gray Wolves***

  Wolves using the area could be disturbed by harvesting activities and are most sensitive at den and rendezvous sites, which are not known to occur in the project area. After harvesting activities, human disturbance levels would likely revert to preharvest levels. Likewise, the potential for any wolf use of the project area for denning and rendezvous sites would likely revert to preharvest levels. In the short-term (approximately 2 to 4 years), the proposed harvest units could lead to shifts in big game use, which could lead to a shift in wolf use of the project area due to human disturbance associated with logging activities. Under this alternative, approximately 0.3 mile of new road would be constructed and 0.26 mile of open road would be closed. Currently closed roads would be opened for harvesting activities for no more than 4 consecutive seasons. Following harvesting, opened roads and newly constructed roads would be closed to motorized use. Harvesting would result in the reduction of 578 acres of thermal cover on big game winter ranges in the project area. These reductions in cover on big game winter ranges may result in shifts in prey availability for wolves. Shifts in prey availability may reduce the amount of wolf use in the project area. Additional impacts to the big game winter ranges are discussed in subsequent discussion. Thus, minor adverse direct and indirect

effects would be expected to affect gray wolves since 1) minor, short-term increases and no long-term changes in human disturbance levels would occur, with no increases near known wolf den and/or rendezvous sites anticipated, 2) no long-term changes in motorized access would occur, and 3) reductions in habitat quality of big game winter range may shift wolf use.

- ***Cumulative Effects of the No-Action Alternative on Gray Wolves***

  White-tailed deer, mule deer, and elk winter range would not be affected, and change in big game populations, distribution, or habitat use would be not anticipated. Levels of human disturbance would be expected to remain at present levels. Future harvesting on lands in the cumulative-effects analysis area may cause shifts in white-tailed deer use and, subsequently, gray wolf use of the cumulative-effects analysis area. However, no changes in motorized access or vegetation abundance or structure would occur on the project area that would alter levels of gray wolf use of the cumulative-effects analysis area under this alternative. Thus, no cumulative effects would be expected to affect gray wolves since 1) no changes in human disturbance levels would occur, particularly near known wolf den and/or rendezvous sites and 2) no changes to big game winter range would occur.

- ***Cumulative Effects of the Action Alternative on Gray Wolves***

  In the cumulative-effects analysis area, some slight shifts of big game use may occur. Reductions in cover may cause slight decreases in use by deer and elk; however, no appreciable changes in deer and elk distribution or abundance would be expected at the scale of the cumulative-effects analysis area. Minor reductions to big game winter ranges would be expected and are addressed in the subsequent discussion. The reductions that would occur under this alternative to big game winter ranges would not be expected to affect the overall use of the cumulative-effects analysis area by wolves. Under this alternative, approximately 0.3 mile of new road would be constructed and 0.26 mile of open road would be closed. All temporarily opened roads would be closed to motorized public use following harvesting activities, but may facilitate nonmotorized access. This increased access may result in an increase in human and wolf interactions. Additionally, increased accessibility may allow for increased hunter/big game interactions as well. Reductions in cover would be additive to losses from past timber-harvesting activities in the cumulative-effects analysis area. Human-disturbance levels would be expected to revert to levels similar to current levels after the proposed harvesting has been completed and roads would again be closed. No substantive change in wolf use of the cumulative-effects analysis area would be expected; wolves would be expected to continue to use the area

in the long-term (approximately 5 to 10 years). Thus, minor adverse cumulative effects to gray wolves would be anticipated since 1)localized disturbance would occur due to logging activities in the area, 2) motorized access would not increase, 3) no known den or rendezvous sites are located in the cumulative-effects analysis area, and 4) habitat quality would be reduced on 578 acres of winter range, which could slightly lower its winter carrying capacity across the cumulative-effects analysis area and alter prey distribution, particularly for white-tailed deer.

SENSITIVE SPECIES

When conducting forest-management activities, the SFLMP directs DNRC to give special consideration to sensitive species. These species may be sensitive to human activities, have special habitat requirements, are associated with habitats that may be altered by timber management, and/or may, if management activities result in continued adverse impacts, become listed under the federal *Endangered Species Act*. Because sensitive species usually have specific habitat requirements, consideration of their needs serves as a useful 'fine filter' for ensuring that the primary goal of maintaining healthy and diverse forests is met. As shown in ***TABLE II-D-1 - STATUS OF SPECIES CONSIDERED IN THE FINE-FILTER ANALYSIS FOR THIS PROPOSED PROJECT***, the sensitive species portion of this analysis will focus on fishers, flammulated owls, pileated woodpeckers, and big game winter range.

- ***FISHER***

Issue: Concern was expressed that timber harvesting and associated activities could reduce fisher habitat availability and quality by reducing canopy cover, snag density, and the amount of coarse woody debris.

Introduction

Fishers are generalist predators that prey on a variety of small mammals and birds, as well as snowshoe hares and porcupines. They also take advantage of carrion and seasonally available fruits and berries (*Foresman 2001*). Fishers use a variety of successional stages, but are disproportionately found in mature stands with dense canopies (*Powell 1982, Johnson 1984, Jones 1991, Heinemeyer and Jones 1994*) and avoid openings or young forested stands (*Buskirk and Powell 1994*). However, some use of openings does occur for short hunting forays or if sufficient overhead cover (shrubs, saplings) is present. Fishers appear to be highly selective of stands that contain resting and denning sites and tend to use areas within 150 feet of water (*Jones 1991*). Resting and denning sites are found in cavities of live trees and snags, downed logs, brush piles, mistletoe brooms, squirrel and raptor nests, and holes in the ground. Forest-management considerations for fisher involve providing for resting and denning habitats near riparian areas while maintaining travel corridors.

Analysis Areas

Direct and indirect effects were analyzed for activities conducted in the 1,484-acre project area. Cumulative effects were analyzed on the 79,995-acre cumulative-

effects analysis area described above. This scale includes enough area to approximate overlapping home ranges of male and female fishers (*Heinemeyer and Jones 1994*).

Analysis Methods

To assess potential fisher habitat and travel cover on DNRC-managed lands in the cumulative-effects analysis area, sawtimber stands in preferred fisher covertypes (*ARM 36.11.403(60)*) below 6,000 feet in elevation with 40 percent or greater canopy closure were considered potential fisher habitat. DNRC manages preferred fisher covertypes in 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the sawtimber size class in moderate to well-stocked density (*ARM 36.11.440(1)(b)(i)*). Fisher habitat was further divided into upland and riparian-associated areas, depending on the proximity to streams and based on stream class. Direct and indirect effects were analyzed using field evaluations and GIS analysis of potential habitat. Cumulative effects were analyzed using field evaluations and GIS analysis of potential habitat and aerial-photograph interpretation of potential habitat on all other lands in the cumulative-effects analysis area. Factors considered include the amount of suitable fisher habitats, landscape connectivity, and human access. Snags and coarse woody debris were visually assessed during site visits and while reviewing past DNRC harvesting information. Factors considered in the analysis include the level of harvesting, number of snags, relative amounts of coarse woody debris, and risk level of firewood harvesting.

Existing Environment

The project area ranges from 3,680 to 4,720 feet in elevation, with approximately 4.2 miles of perennial streams and at least another 1.2 miles of intermittent streams. DNRC manages preferred fisher covertypes in 100 feet of Class 1 and 50 feet of Class 2 streams, so that 75 percent of the acreage (trust lands only) would be in the sawtimber size class in moderate to well-stocked density *(ARM 36.11.440[1][b][i]*). Approximately 100 acres are in these riparian areas in the project area along the 5.4 miles of Class 1 and 2 streams. Modeling fisher habitats using SLI data generated an estimate of 1,148 acres of fisher foraging, resting, denning, and travel habitats (1,048 upland acres and 100 riparian acres) in the project area (*Heinemeyer and Jones 1994*). In the riparian areas, all of the preferred fisher covertypes (100 acres, or 100 percent) are moderately or well-stocked and likely support the structural features necessary for use as fisher resting and denning habitats in addition to serving as travel habitats and maintaining landscape connectivity. This exceeds the threshold of 75 percent, as established by *ARM 36.11.440*. During field visits, approximately 8 variably-spaced snags per acre and 5 to 10 tons of coarse woody debris per acre were observed in the project area.

In the cumulative-effects analysis area on DNRC-managed lands, 2,240 acres of moderately or well-stocked fisher covertypes support the structural features necessary for use as fisher travel, resting, and denning habitats. Approximately 195 acres of preferred fisher covertypes occur along the 6.7 miles of perennial and 4.5

miles of intermittent streams on DNRC-managed lands in the cumulative-effects analysis area; 191 of those acres are currently in the sawtimber size class in moderate to well-stocked densities. The areas adjacent to streams on other ownerships may contribute to the total riparian fisher habitats in the cumulative-effects analysis area. DNRC-managed lands in the cumulative-effects analysis area provide approximately 2,240 acres of potential upland fisher habitats. Lands managed under other ownerships in the cumulative-effects analysis area likely provide additional upland fisher habitats. An extensive network of roads exist in the cumulative-effects analysis area; many are closed to public access, but may facilitate nonmotorized traffic. Past harvesting has limited snag and coarse woody debris densities in some of the cumulative-effects analysis area.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Fishers***

  No effects to fishers would be expected under this alternative. Little change to the stands providing fisher denning and foraging habitats would be expected. Human disturbance and potential trapping mortality would expect to remain similar to current levels. No changes in landscape connectivity would occur. Thus, no direct and indirect effects would affect fishers in the project area since 1) no changes to existing habitats would be anticipated, 2) landscape connectivity would not be altered, 3) no appreciable changes to snags, snag recruits, and coarse woody debris levels would be anticipated, and 4) no changes to human access or the potential for trapping mortality would be anticipated.

- ***Direct and Indirect Effects of the Action Alternative on Fishers***

  Approximately 15 acres of the 100 acres of riparian habitats in the project area would be included in the proposed units. All of these acres are presently meeting structural requirements of fisher. Approximately 399 of the 1,148 acres (35 percent) of upland fisher habitats in the project area would receive treatments that would likely yield stands too open for appreciable fisher use. Following harvesting, motorized human access would be expected to return to preharvest levels. Minor reductions in connectivity would be expected (see *WILDLIFE-MATURE FORESTED HABITATS AND LANDSCAPE CONNECTIVITY*). Ten to fifteen tons of coarse woody debris per acre would be retained. Thus, minor adverse direct and indirect effects would be anticipated that would affect fisher in the project area for 70 to 100 years since 1) harvesting would reduce or remove (approximately 35 percent) upland fisher habitats and mature upland stands in preferred covertypes, 2) minor reductions in landscape connectivity would occur, 3) harvesting would reduce snag and coarse woody debris levels, however, some of these resources would be retained, and 4) motorized human access levels would remain unchanged.

- ***Cumulative Effects of the No-Action Alternative on Fishers***

  Fisher denning and resting habitats would be retained. Suitable fisher foraging, denning, and resting habitats occur across the cumulative-effects analysis area. Landscape connectivity in the cumulative-effects analysis area is largely intact. Road access in the cumulative-effects analysis area would not appreciably change; therefore, fisher vulnerability to trapping would remain unchanged. Thus, no further cumulative effects to fishers would be anticipated in the cumulative-effects analysis area since 1) no changes to existing habitats on DNRC-managed land would occur, 2) landscape connectivity afforded by the stands on DNRC-managed land would not appreciably change, 3) no changes to snags, snag recruits, or coarse woody debris levels would be expected, and 4) no changes to human access or the potential for trapping mortality would be anticipated.

- ***Cumulative Effects of the Action Alternative on Fishers***

  Approximately 15 acres of potential riparian fisher habitats in the cumulative-effects analysis area would be harvested. This would reduce the amount of the preferred fisher covertypes on DNRC-managed lands meeting structural requirements for fishers from 98 percent to 91 percent in the cumulative-effects analysis area , which exceeds the 75 percent threshold established in *ARM 36.11.440(1)(b)(i)*. Roughly 399 acres of the 2,240 acres (18 percent) of potential fisher foraging and travel habitats in the uplands would be harvested. These reductions would be additive to the losses associated with past timber harvesting in the cumulative-effects analysis area. Landscape connectivity in the cumulative-effects analysis area would remain largely intact. Once harvesting has been completed, human disturbance would be expected to return to the preharvest levels. Thus, minor adverse cumulative effects would be anticipated that would affect fisher in the project area for 70 to 100 years since 1) harvesting would remove upland fisher habitats and mature upland stands in preferred fisher covertypes, but considerable upland habitats would persist;,2) negligible changes to preferred covertypes or fisher habitats associated with the riparian areas in the cumulative-effects analysis area would be anticipated, 3) negligible reductions in landscape connectivity would be anticipated, 4) harvesting would partially reduce snags and snag recruits, while increasing the coarse woody debris levels, largely in the smaller-sized pieces, and 5) no changes to motorized human access would occur.

- ***FLAMMULATED OWL***

Issue: Concern was expressed that timber harvesting and associated activities could alter habitat attributes needed by flammulated owls for nesting.

Introduction

Flammulated owls are tiny, migratory, insectivorous forest owls that inhabit old, open stands of warm-dry ponderosa pine and cool-dry Douglas-fir forests in the western United States and are secondary cavity nesters. They usually nest in cavities excavated by pileated woodpeckers or northern flickers in 12- to 25-inch dbh aspen, ponderosa pine, or Douglas-fir. Without disturbance, Douglas-fir encroachment into ponderosa pine stands can increase stand density and result in decreased habitat quality for flammulated owls.

Analysis Areas

Direct and indirect effects were analyzed on the 1,484-acre project area. Cumulative effects were analyzed on the on the 21 surrounding sections and the project area (approximately 13,440 acres). This scale includes enough area to support several pairs of flammulated owls (*McCallum 1994*).

Analysis Methods

To assess potential flammulated owl habitats on the project area, SLI data were used to identify stands in preferred habitat types (*ARM 36.11.403[28]*). Direct and indirect effects, as well as cumulative effects, were analyzed using a combination of field evaluation, aerial-photograph interpretation, and a GIS analysis of available habitats. Factors considered in the cumulative-effects analysis area included the degree of harvesting and the amount of continuous forest in the cumulative-effects analysis area.

Existing Environment

The stands in the project area are largely Douglas-fir, western larch, and mixed conifer. In the project area are approximately 176 acres of potential flammulated owl habitats. The current conditions may be partially a result of the encroachment by shade-tolerant species in the past. During field visits, approximately 8 variably-spaced snags per acre and approximately 5 to 10 tons of coarse woody debris per acre were observed in the project area. Approximately 7 snags per acre in the 8- to 16-inch dbh class approximately 0.6 snag per acres in the 17- to 20-inch dbh class, and approximately 0.6 snag per acre in the greater than 21-inch dbh class exist in the project area. The snags exhibit a large range of decay classes.

In the cumulative-effects analysis area, a portion of the area (roughly 15 percent) exists in relatively open forested conditions, which are primarily the result of recent timber-harvesting activities. Largely, these areas are not currently useful for flammulated owl nesting, but may serve as foraging habitats. Modern fire suppression has allowed Douglas-fir ingrowth to create denser stands of mixed ponderosa pine and Douglas-fir in portions of the cumulative-effects analysis area, which has reduced habitat quality for flammulated owls.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Flammulated Owls***

  Existing flammulated nesting habitats in the project area would continue maturing. In the long-term, stands once with a mix of ponderosa pine could continue to be converted to Douglas-fir stands through succession, become densely stocked, and exist at high risk to insects, diseases, and stand-replacement fires. Therefore, habitat sustainability and quality for flammulated owls would continue to decline. Thus, a moderate degree of adverse indirect effects would be expected to affect flammulated owls in the project area since: 1) no harvesting would occur, 2) no changes to potential nesting habitats would be anticipated, and 3) slight long-term, succession-related declines in foraging habitats, coupled with advancing succession would lead to denser stands.

- ***Direct and Indirect Effects of the Action Alternative on Flammulated Owls***

  Flammulated owls are tolerant of human disturbance (*McCallum 1994*); however, the elevated disturbance levels associated with harvesting could negatively impact flammulated owls should they use existing habitat during the nesting period (June through August). The proposed timber harvesting would open the canopy while favoring western larch and ponderosa pine. Elements of the forest structure important for nesting flammulated owls, including snags (a minimum of 2 snags per acre greater than 21 inches dbh where they exist, otherwise the next largest size class), coarse woody debris (10 to 15 tons per acre), numerous leave trees, and snag recruits (greater than 21 inches dbh where they exist, otherwise the next largest size class) would be retained in the proposed harvest units. Realistically, however, some snags would likely be removed due to safety and/or logistical concerns (see *SNAGS AND COARSE WOODY DEBRIS*), which could affect flammulated owls. The more-open stand conditions, the retention of fire-adapted tree species, and the maintenance of snags and large recruitment trees would move the proposed project area toward historical conditions, which is preferred flammulated owl habitat. Thus, moderate positive direct and indirect effects would be expected to affect flammulated owls in the project area for the next 30 to 50 years since 1) harvesting would open up dense stands, 2) elements of forest structure (snags, snag recruits, and coarse woody debris) used for foraging and nesting by flammulated owl would be retained, 3) prescriptions would lead to more-open stands with mature ponderosa pine present, and 4) prescriptions would promote future development of ponderosa pine and western larch in the harvest units.

- ***Cumulative Effects of the No-Action Alternative on Flammulated Owls***

  Portions of the cumulative-effects analysis area have been harvested in the recent past, potentially improving flammulated owl habitats by creating foraging habitats and reversing a portion of the Douglas-fir encroachment. No harvesting would

occur on DNRC-managed lands, and areas exhibiting mature forested conditions would be expected to persist and could provide flammulated owl nesting habitats. Other portions of the cumulative-effects analysis area that are not currently providing flammulated owl habitats due to encroachment are not expected to change any time in the near future. Collectively, stands would continue maturing and become more densely stocked, which would reduce habitat quality for flammulated owls. Thus, a low degree of adverse indirect effects would be expected to affect flammulated owls in the cumulative-effects analysis area since 1) no harvesting would occur on the project area, 2) no changes to potential nesting habitats would be anticipated, and 3) long-term, succession-related declines in foraging habitats, coupled with advancing succession, would lead to denser stands.

- ***Cumulative Effects of the Action Alternative on Flammulated Owls***

  Proposed harvesting would add to the amount of the cumulative-effects analysis area that has been recently harvested, which would add to the amount of foraging habitats available, but possibly at the expense of nesting habitats. Although reductions in mature forested stands would occur, additional potential nesting habitats in the cumulative-effects analysis area would not be expected to change in the near future. The portions of the cumulative-effects analysis area that are not currently providing flammulated owl habitats due to encroachment would not be expected to change any time in the near future. Collectively, stands would continue maturing and become more densely stocked, which would reduce habitat quality for flammulated owls. Thus, minor beneficial cumulative effects would be expected to affect flammulated owls in the cumulative-effects analysis area since 1) harvesting would improve flammulated owl nesting habitats and create foraging habitats and 2) a small increase in the amount of the cumulative-effects analysis area that would be more representative of historic conditions would occur.

➢ ***PILEATED WOODPECKER***

Issue: Concern was expressed that timber harvesting and associated activities could remove canopy cover and snags needed by pileated woodpeckers to forage and nest and/or displace nesting pileated woodpeckers.

Introduction

Pileated woodpeckers play an important ecological role by excavating cavities that are used in subsequent years by many other species of birds and mammals. Pileated woodpeckers excavate the largest cavities of any woodpecker. Preferred nest trees are western larch, ponderosa pine, cottonwood, and quaking aspen, usually 20 inches dbh and larger. Pileated woodpeckers primarily eat carpenter ants, which inhabit large downed logs, stumps, and snags. *Aney and McClelland (1985)* described pileated nesting habitat as... "stands of 50 to 100 contiguous acres, generally below 5,000 feet in elevation, with basal areas of 100 to 125 square feet

per acre, and a relatively closed canopy." The feeding and nesting habitat requirements, including large snags or decayed trees for nesting and downed wood for feeding, closely tie these woodpeckers to mature forests with late-successional characteristics. The density of pileated woodpeckers is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*).

Analysis Area

Direct and indirect effects were analyzed for activities conducted in the 1,484-acre project area. Cumulative effects were analyzed on the 21 surrounding sections and the project area (approximately 13,440 acres). This scale includes enough area to support multiple pairs of pileated woodpeckers if enough suitable habitat is present (*Bull and Jackson 1995*).

Analysis Methods

To assess potential pileated woodpecker nesting habitats on DNRC-managed lands in the cumulative-effects analysis area, SLI data were used to identify sawtimber stands with more than 100 square feet of basal area per acre, were older than 100 years old, and had greater than 40-percent canopy closure. Foraging habitats are areas that do not meet the above definition, but include the remaining sawtimber stands with greater than 40-percent canopy cover. Direct and indirect effects, as well as cumulative effects, were analyzed using a combination of field evaluation, aerial-photograph interpretation, and these mapped potential habitats. Factors considered included the amount of potential habitat, degree of harvesting, and the amount of continuous forested habitat.

Existing Environment

In the project area, potential pileated woodpecker nesting habitat exists on approximately 526 acres that are dominated by Douglas-fir, western larch, and mixed conifer. Although nesting habitat is defined differently than foraging habitat, nesting habitat also provides foraging opportunities for pileated woodpeckers. Large live and dead trees are fairly common in the project area. Large (greater than 21 inches dbh) western larch, which could become suitable nesting sites, exist in the project area, and existing Douglas-fir/western larch stands are likely providing foraging habitats.

Similar to the project area, nesting habitats in the cumulative-effects analysis area are dominated by Douglas-fir and western larch covertypes. In the cumulative-effects analysis area, extensive harvesting has occurred in the past, which has fragmented the contiguous forest to a degree. However, in the more recent past, stands have been managed for mature western larch and western white pine, snags, and snag-recruit trees, which benefit pileated woodpeckers in the long-term.

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Pileated Woodpeckers***

  No disturbance of pileated woodpeckers would occur that might impact nesting pileated woodpeckers. Forest succession and natural disturbance agents would continue to bring about changes in existing stands. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for

pileated woodpeckers. Continual conversion to shade-tolerant species would reduce the quality of habitat for pileated woodpeckers over time. Therefore, a reduction in suitable nesting trees would be likely over time, which could lead to decreased quality of suitable nesting habitat in the project area. Thus, negligible adverse indirect effects to pileated woodpeckers in the project area would be expected until some other disturbance reverses stand succession since 1) no further harvesting would occur, 2) no changes in the amount of continuously forested habitats would be anticipated, 3) no appreciable changes to existing pileated woodpecker habitats would be anticipated, and 4) long-term, succession-related declines in the abundance of shade-intolerant tree species, which are valuable to pileated woodpeckers, would be anticipated.

- ***Direct and Indirect Effects of the Action Alternative on Pileated Woodpeckers***

  Pileated woodpeckers tend to be tolerant of human activities (*Bull and Jackson 1995*), but might be temporarily displaced by the proposed harvesting. Under this alternative, 320 acres of pileated woodpecker habitat (with potential for both nesting and foraging) would be harvested. Harvesting 320 acres would reduce continuously forested habitats for pileated woodpeckers. Elements of the forest structure important for nesting pileated woodpeckers, including snags (a minimum of 2 snags greater than 21 inch dbh per acre where they exist and would be expected to persist), coarse woody debris (10 to 15 tons per acre), numerous large trees, and snag recruits (a minimum of 2 trees per acre greater than 21 inches dbh where they exist) would be retained in the proposed units. Since pileated woodpecker density is positively correlated with the amount of dead and/or dying wood in a stand (*McClelland 1979*), near-term habitat quality in the project area would be expected to be reduced on 320 acres. Thus, minor adverse direct and indirect effects that would affect pileated woodpeckers in the project area for 20 to 50 years would be anticipated since 1) harvesting would reduce the amount of continuous forested habitats available, 2) potential nesting and foraging habitats would be reduced, 3) several snags and snag recruits per acre would be removed; however, mitigation measures would include the retention of 2 snags and 2 snag recruits per acre, and 4) harvest prescriptions would promote seral species in the proposed units.

- ***Cumulative Effects of the No-Action Alternative on Pileated Woodpeckers***

  No disturbance of pileated woodpeckers would occur. Trees would continue to grow, mature, and die, thus providing potential nesting and foraging structure for pileated woodpeckers. Individuals utilizing the cumulative-effects analysis area would be expected to continue to do so. Any ongoing harvesting would continue to remove potential pileated woodpecker habitats while reducing the amount of the cumulative-effects analysis area that would be in mature, forested covertypes. Thus, no cumulative impacts to pileated woodpeckers

would be anticipated in the short-term (0 to 20 years), but slight adverse cumulative effects to pileated woodpeckers in the cumulative-effects analysis area would be expected over the longer term (more than 50 years) since 1) no further changes to existing habitats would occur, 2) no further changes to the amount of continuously forested habitats available for pileated woodpeckers would be anticipated, and 3) long-term, succession-related declines in the abundance of shade-intolerant tree species would occur, which are valuable to pileated woodpeckers.

- ***Cumulative Effects of the Action Alternative on Pileated Woodpeckers***

  Under this alternative, pileated woodpecker habitat would be temporarily degraded on 320 acres. Snags, coarse woody debris, and some potential nesting trees would be retained in the project area, and future recruitment of these attributes would be enhanced through the retention of some large snag recruits. Recently harvested stands in the cumulative-effects analysis area have reduced pileated woodpecker habitats as well. The loss of pileated woodpecker habitats under this alternative would be additive to habitat losses associated with past harvesting in the cumulative-effects analysis area; continued widespread use would be expected. Additionally, continued maturation of stands across the analysis area is increasing suitable pileated woodpecker habitats. Thus, overall minor adverse cumulative effects would be anticipated that would affect pileated woodpeckers in the cumulative-effects analysis area for the next 20 to 50 years since 1) harvesting would reduce the amount of continuous forested habitats available in the cumulative-effects analysis area, but forested habitats would persist, 2) in the short-term (20 to 50 years), habitat quality of potential nesting and foraging habitats would be reduced, but habitats would persist in the cumulative-effects analysis area, 3) several snags and snag recruits per acre would be removed in the proposed units; however, mitigation measures would retain some of these attributes in several of the units, and 4) harvest prescriptions would promote seral species in the proposed units.

BIG GAME SPECIES

BIG GAME WINTER RANGE

Issue: Concern was expressed that timber harvesting and associated activities could reduce thermal cover on big game winter ranges, which could reduce the carrying capacity of the winter range.

Introduction

Winter ranges enable big game survival by minimizing the effects of severe winter weather conditions. Winter ranges tend to occur at the lower elevation zones that receive less snow and support large numbers of big game, which are widely distributed during the remainder of the year. These winter ranges have adequate midstory and overstory to reduce wind velocity and intercept snow while moderating ambient temperatures. Besides providing a moderated climate, the snow-intercept capacity effectively lowers snow depths, which enables big game movement and

access to forage. Snow depths differentially affect big game; deer are most affected, followed by elk, then moose.

Analysis Area

Direct and indirect effects were analyzed on the 1,484-acre project area. Cumulative effects were analyzed on a 79,995-acre cumulative-effects analysis area, described above. This cumulative-effects analysis area should supply enough area to provide winter habitat for several hundred wintering deer and elk.

Analysis Methods

Effects were evaluated using a combination of field evaluation, aerial-photograph interpretation, assessment of the DFWP winter-range map layers, and GIS analysis. Factors considered in this cumulative-effects analysis area include acres of winter range harvested and the level of human disturbance and development.

Existing Environment

Large portions of the white-tailed deer and elk winter ranges (1,480 acres and 846 acres, respectively) were identified in the project area as mapped by the DFWP unpublished interagency map (2004). Winter snow depths and suitable microclimates influence big game distribution and use in the vicinity. Mature Douglas-fir stands in the project area are providing attributes facilitating use by wintering big game. A large portion of the project area is providing mature forest cover and, in turn, thermal cover and snow intercept. Evidence of use by deer, elk, and moose was noted throughout the project area during field visits.

Currently, in the cumulative-effects analysis area, approximately 38,418 acres of white-tailed deer winter range, 2,716 acres of mule deer winter range, and 47,779 acres of elk winter range exist as identified by DFWP. Presently, a large portion of the acreage across the 79,995-acre cumulative-effects analysis area is capable of providing thermal cover and snow intercept for big game. In the recent past, harvesting on other ownerships in the cumulative-effects analysis area has reduced thermal cover and snow intercept (approximately 15 percent of the cumulative-effects analysis area).

Environmental Effects

- ***Direct and Indirect Effects of the No-Action Alternative on Big Game Winter Range***

  No direct or indirect effects to big game winter range would be anticipated. No additional disturbance or displacement would be anticipated in the project area. Big game thermal cover in the project area would not be altered in the near term. In the longer-term, continued succession could reduce forage production while increasing thermal cover in these stands. No appreciable changes to the winter carrying capacity would be anticipated. No direct or indirect effects to big game winter range would be anticipated since 1) canopy densities would increase as a result of subtle changes in thermal cover due to mortality and successional advances, 2) the amount of mature forested habitats on the winter range would not change appreciably, and 3) the levels of human disturbance would remain the same.

- ***Direct and Indirect Effects of the Action Alternative on Big Game Winter Range***

  Some short-term (2 to 4 years) displacement, attributable to motorized logging disturbance, would be expected as a result of the proposed harvesting operations. The regeneration

prescriptions on 578 acres of the winter range would create more-open stands that would be, largely, too open to function as thermal cover or snow intercept, thus eliminating habitat attributes that would enable concentrated winter use by deer and elk. These losses of thermal cover and snow intercept would require 40 to 60 years for suitably-sized trees (greater than 40 feet tall) to develop in the stand. Thus, moderate adverse direct and indirect effects to big game and the habitat carrying capacity would be expected for the next 40 to 60 years since 1) logging activities would create disturbance in this area for a relatively short term and 2) a large percentage of the winter range in the project area would be altered.

- ***Cumulative Effects of the No-Action Alternative on Big Game Winter Range***

  No changes would be anticipated in thermal cover and snow intercept. Stands that are providing thermal cover would be expected to continue providing this attribute under this alternative. Continued winter use of the larger winter range would be expected. Harvesting on private lands and USFS lands could continue to displace wintering big game and reduce available winter range habitats. Those portions of the winter range where timber harvesting occurred in the last 30 years could start developing thermal cover and snow intercept in the next 10 to 30 years. Human disturbance levels would be anticipated to continue at the same levels. Thus, no cumulative effects to the big game winter range or big game species would be expected as a result of this alternative.

- ***Cumulative Effects of the Action Alternative on Big Game Winter Range***

  Thermal cover would be largely removed from approximately 578 acres of the deer and elk winter ranges, which would be additive to ongoing and past reductions across the cumulative-effects analysis area. Approximately 15 percent of the cumulative-effects analysis area could start providing some habitat attributes suitable for winter big game use in the near future as they continue maturing with time. Thus, a low degree of adverse cumulative effects to white-tailed deer and elk and a reduced carrying capacity of the winter range would be expected for the next 40 to 60 years since 1) logging activities would create disturbance in a small portion of the cumulative-effects analysis area for a relatively short term, 2) a small percentage (approximately 1 percent) of the winter range in the cumulative-effects analysis area would be altered, 3) deer and elk possess a degree of behavioral adaptability, and 4) cover is available on surrounding ownerships that provides some opportunity for deer and elk should they be displaced.

WILDLIFE MITIGATIONS

- Consult a DNRC biologist if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing threatened and endangered species (*ARM 36.11.428* through *36.11.435*) are needed.
- Manage for snags, snag recruits, and coarse woody debris according to ARM *36.11.411* through *36.11.414*, particularly favoring western larch, ponderosa pine, Douglas-fir, and western white pine.

- In retention and regeneration decisions, favor western larch and ponderosa pine in for pileated woodpecker and flammulated owl nesting and foraging habitats.
- Effectively close roads after the proposed activities have been completed to reduce the potential for unauthorized motor vehicle use and/or loss of snags to firewood gathering and use temporary roads wherever possible.
- Closed roads opened for harvesting activities must be open no longer than 4 consecutive seasons.
- Restrict public access at all times on restricted roads that are opened using signs during active periods and a physical closure (gate, barriers, equipment, etc.) during inactive periods (nights, weekends, etc.).
- Use a combination of topography, group retention, and roadside vegetation to reduce views into harvest units along open roads.
- Prohibit contractors and purchasers conducting contract operations from carrying firearms while operating on restricted roads.

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ATTACHMENT III
PRESCRIPTIONS

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENT
Jim Creek Geographical Area				
25.2	Improvement cut	18/160	A commercial-thin prescription would be utilized. Whitewood species and senescent western larch and Douglas-fir would be harvested in this stand. The treatment would achieve crown spacing between vigorous western larch and Douglas-fir to allow for better growth.	No follow-up treatments are required.
25.3	Regeneration harvest	7/1	Remove trees of poor form and vigor and trees along the road that impede road maintenance activities.	Slash, unless utilized as biomass, would be piled and burned. Areas fitting regeneration specifications would be mechanically site prepped. Seedlings would be planted where needed.
25.4	Regeneration harvest	2/9	A harvest prescription of seedtree with reserves would be utilized.	Submerchantable trees with low vigor would be removed and slash, unless used as biomass, would be piled and burned. Areas fitting regeneration specifications would be mechanically site prepped. Seedlings would be planted where needed.

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENT
Jim Creek Geographical Area (continued)				
36.1	Combination commercial-thin and regeneration harvest	18/72	Approximately 50 percent of the area would be commercially thinned; the other 50 percent would receive a seedtree-with-reserves prescription.	Submerchantable trees with low vigor would be removed and slash, unless used as biomass, would be piled and burned. Areas fitting regeneration specifications would be mechanically site prepped. Seedlings would be planted where needed.
36.3	Combination overstory removal/ commercial-thin and regeneration harvest	52/120	Approximately 50 percent of the area would have overstory trees with low vigor removed and dense thickets of pole-sized trees commercially thinned. The remaining 50 percent of the area would receive a seedtree-with-reserves prescription.	
36.4	Regeneration harvest	28/182	A seedtree-with-reserves harvest prescription would be utilized. Extra reserve trees may be retained on the ridges and drier sites. The vigorous advanced regeneration would be retained..	
36.5		21/88		
Beaver Creek Geographical Area				
16.1	Combination commercial thin and regeneration harvest	44/234	Approximately 33 percent of the area would be commercially thinned and 70 percent would receive a seedtree-with-reserves prescription.	

ATTACHMENT III - PRESCRIPTIONS (continued)

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENT
Beaver Creek Geographical Area (continued)				
16.2	Overstory removal	16/102	Overstory trees will be removed in order to promote the growth of understory trees. Approximately 2 large (greater than 21 inches dbh) trees and snags will be left, as well as vigorous younger (0 to 49 years old) age class trees.	The submerchantable trees with low vigor would be removed and slash, unless utilized as biomass, would be piled and burned.
16.3	Regeneration harvest	38/243	A seedtree-with-reserves harvest prescription would be utilized. Extra reserve trees may be retained on the ridges and drier sites. The vigorous advanced regeneration would be retained.	The submerchantable trees with low vigor would be removed and slash, unless utilized as biomass, would be piled and burned. Areas fitting regenerations specifications would be mechanically site prepped. Seedlings would be planted where needed.
16.4	Combination commercial thin and regeneration harvest	38/201	Approximately 40 percent of the area would be commercially thinned and 60 percent would receive a seedtree-with-reserves prescription.	
16.5	Regeneration harvest	49/314	A seedtree-with-reserves harvest prescription would be utilized; extra reserve trees may be retained n the ridges and drier sites. The vigorous and advanced regeneration would be retained.	

ATTACHMENT III - PRESCRIPTIONS (continued)

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENT
Beaver Creek Geographical Area (continued)				
16.6	Combination commercial thin and regeneration harvest	85/451	Approximately 60 percent of the area would be commercially thinned and 40 percent would receive a seedtree-with-reserves prescription.	The submerchantable trees with low vigor would be removed and slash, unless utilized as biomass, would be piled and burned. Areas fitting regenerations specifications would be mechanically site prepped. Seedlings would be planted where needed.
16.7	Combination regeneration harvest and overstory removal	11/70	Approximately 60 percent of the area would receive a seedtree-with-reserves prescription and 40 percent would receive an overstory-removal prescription.	
16.8		35/224	Approximately 60 percent of the area would receive a seedtree-with-reserves prescription and 40 percent would receive an overstory-removal prescription.	
16.9	Regeneration harvest	6/38	A seedtree-with-reserves harvest prescription would be utilized; extra reserve trees may be retained on the ridges and drier sites. Vigorous advanced regeneration would be retained.	
16.10		7/45		

PROPOSED HARVEST AREA	PROPOSED TREATMENT	TOTAL ACRES HARVESTED/ ESTIMATED VOLUME (Mbf)	HARVEST PARTICULARS	FOLLOW-UP TREATMENT
Beaver Creek Geographical Area (continued)				
16.11	Precommercial thin	82/0	The growth of crop trees would be improved by reducing the density through thinning and retaining the most vigorous and healthy dominant and co-dominant trees.	None.

ATTACHMENT IV
STIPULATIONS AND SPECIFICATIONS

AESTHETICS

- Logging-damaged residual vegetation visible from open roads will be slashed.
- Landings will be limited in size and number and be located away from main roads when possible.
- Some harvest areas will include designated 'uncut' areas, and most areas will have trees remaining in clumps or groups. This, along with leaving strips of small trees along roads will help reduce sight distance into these harvest areas.

ARCHAEOLOGY

A contract clause provides for suspending operations if cultural resources were discovered. A DNRC archeologist would be consulted and operations may only resume as directed by the Forest Officer.

SOILS

- Equipment operations will be limited to periods when soils are relative-ly dry, (less than 18 percent moisture), frozen, or snow-covered to minimize soil compaction and rutting and maintain drain-age features. Soil moisture conditions will be checked prior to equipment start-up.
- On ground-based units, the logger and sale administrator will agree to a general skid-ding plan prior to equipment opera-tions. The skid-trail planning process will identify which main trails to use and how many additional trails are needed. Trails that do not comply with BMPs (i.e. trails in draw bottoms) will not be used and may be closed with additional drainage installed where needed or grass seed will be planted to stabilize the site and control erosion.
- Tractor skidding will be limited to slopes of less than 40 percent unless the operation can be completed without causing excessive erosion. Based on site review, short, steep slopes above incised draws may require a combination of mitigation measures, such as adverse skidding to a ridge or winchline skidding from more moderate slopes of less than 40 percent.
- Skid trails will be kept to 20 percent or less of the harvest unit acreage. Drainage will be provided in skid trails and roads concurrently with operations.
- Slash disposal - The combination of disturbance and scarification will be limited to 30 to 40 percent of the harvest units. No dozer piling will be done on slopes over 35 percent; no excavator piling will be done on slopes over 40 percent unless the operation can be completed without causing excessive erosion. Lopping and scattering or jackpot burning will be considered on the steeper slopes. Disturbance incurred during skidding opera-tions will be accepted to provide ade-quate scarification for regenera-ion.
- Ten to fifteen tons of large woody debris and a majority of all fine litter feasible will be retained following harvesting. On units where whole tree harvesting is used, one of the following mitigations for nutrient cycling will be implemented: 1) use in-woods processing equipment that leaves slash on site; 2) for whole-tree harvesting, return-skid slash and evenly

distribute within the harvest area; or 3) cut tops from every third bundle of logs so that tops are dispersed as skidding progresses.

VEGETATION

NOXIOUS WEED MANAGEMENT

- All tracked and wheeled equipment will be cleaned of noxious weeds prior to beginning project operations. The forest officer administrating the contract will inspect equipment periodically during project implementation.
- Prompt vegetation seeding (with a native grass seed mix or an annual mix) of disturbed roadside sites will be required. Roads used and closed as part of this proposal will be reshaped and reseeded.
- Herbicide weed spraying may be implemented on roads that are abandoned following the timber sale project.
- Herbicide weed spraying will be implemented on closed roads used in the timber sale project before roadwork takes place and the next spraying season after the roadwork is done.

FUELS MANAGEMENT

Ten to 15 tons of large woody debris will be retained on the forest floor following site preparation.

WILDLIFE

- Consult a DNRC biologist if a threatened or endangered species is encountered to determine if additional mitigations that are consistent with the administrative rules for managing Threatened and Endangered Species (ARM 36.11.428 through 36.11.435) are needed.
- On restricted roads that have been opened for this timber sale project, restrict public access at all times by using signs during active periods and a physical closure (gate, barriers, equipment, etc.) during inactive periods (nights, weekends, etc.).
- Reclose roads and skid trails that have been opened for this timber sale project to reduce the potential for unauthorized motor vehicle use.
- Reduce views into harvest units along open roads by using a combination of topography, group retention, and roadside vegetation.
- Manage for snags, snag recruits, and coarse woody debris according to ARMs 36.11.411 through 36.11.414 by particularly favoring western larch and western white pine.
- Contractors and purchasers conducting contract operations are prohibited from carrying firearms while operating on restricted roads.

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ACRONYMS

ARM	Administrative Rules of Montana
BMP	Best Management Practices
dbh	diameter at breast height
DEQ	Department of Environmental Quality
DFWP	Department of Fish, Wildlife and Parks
DNRC	Department of Natural Resources and Conservation
ECA	Equivalent Clearcut Acres
KNF	Kootenai National Forest
MCA	Montana Codes Annotated
MNHP	Montana Natural Heritage Program
NCDE	Northern Continental Divide Ecosystem
RMZ	Riparian Management Zone
SFLMP	State Forest Land Management Plan
SLI	Stand Level Inventory
SMZ	Streamside Management Zone
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service

ID Team	Intersdisciplinary Team
Land Board	Montana Board of Land Commissioners
124 Permit	Stream protection Act Permit
318 Authorization	Authorization A - Short-term Exemption from Montana's Surface Water-Quality Standards

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